Coastal Regional Sediment Management Plan

San Diego Region

FINAL

Description of Proposed Action and Alternatives In Support of Preparation of A Programmatic Environmental Impact Statement / Programmatic Environmental Impact Report

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1.0 Introduction

This Description of Proposed Action and Alternatives (DOPAA) was prepared in support of preparation of a joint Programmatic Environmental Impact Statement/Programmatic Environmental Impact Report (PEIS/PEIR) to implement the 2009 San Diego Coastal Regional Sediment Management Plan (CRSM Plan or "the Plan"), which was prepared by Moffatt & Nichol (2009) for SANDAG and the California Coastal Sediments Management Workgroup (CSMW). The PEIS/PEIR will address environmental impacts from implementation of the CRSM Plan. The Plan proposes a long-term beneficial sediment re-use strategy to address the long-term beach sediment needs along the shoreline of San Diego County over the next 50 years. This DOPAA describes the project background, purpose and need, detailed descriptions of alternatives, and anticipated issues of concern associated with implementation of this sediment management strategy.

1.1 Study Area

The study area is located along the shoreline and upland areas of the County of San Diego, California. The location of the San Diego region and its representative shoreline area is shown in Figure 1. Receiving beaches are located in all coastal cities within the county including Oceanside, Carlsbad, Encinitas, Solana Beach, Del Mar, San Diego, Coronado, and Imperial Beach. Source material would be derived from upland coastal watersheds and offshore areas generally within 20 miles of receiving beaches.

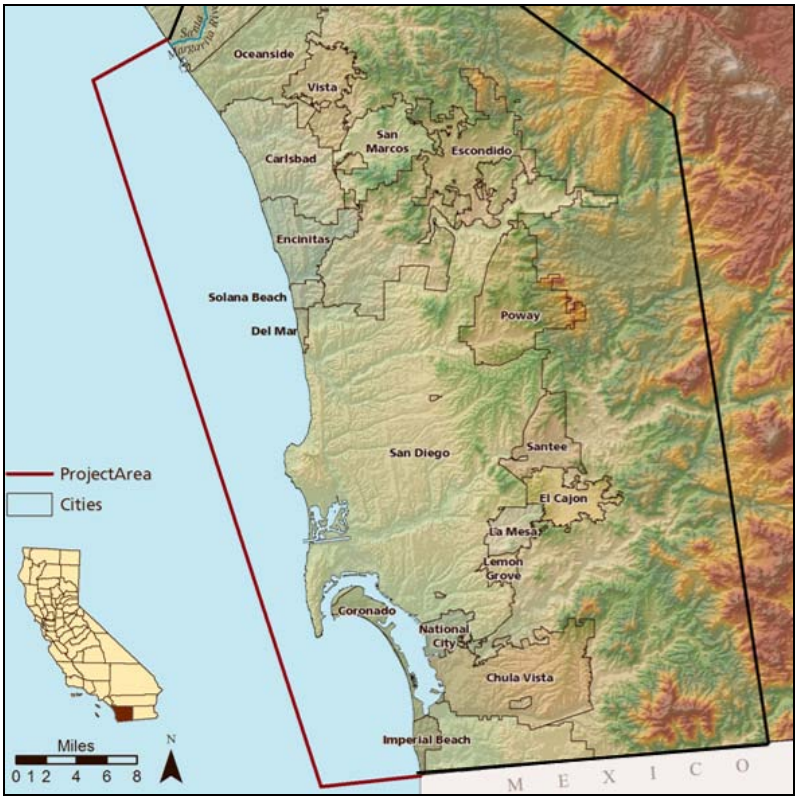

Figure 1. CRSM Plan Area

1.2 Project Background

The San Diego region is committed to preserving beaches for habitat, recreation, tourism, and shoreline protection. The regional governmental entity, the San Diego Association of Governments (SANDAG), which is composed of mayors, council members, and county supervisors from each of the region's 19 local governments, adopted a Shoreline Preservation Strategy (SPS) in 1993 to guide a cooperative, coordinated, and long-range preservation program for the region's shoreline. SANDAG has worked with the State of California and the U. S. Army Corps of Engineers to plan and implement the SPS, which has been the genesis of the following types of beach preservation activities:

- Formation of the regional Shoreline Preservation Working Group (local political leaders, stakeholders, and interested citizens meeting bi-monthly);
- Outreach with local citizen committees concerned about the beaches at the Cities of Oceanside, Carlsbad, Encinitas, and Imperial Beach;
- Local opportunistic beach fill programs such as the Sand Compatibility and Opportunistic Use Program (SCOUP), Carlsbad Opportunistic Beach Fill Program, and other individual sand projects within certain local jurisdictions;
- Partnering with the Coastal Sediment Management Workgroup to conduct regional beach nourishment projects;
- Participation in Federal shoreline protection projects led by the U.S. Army Corps of Engineers (USACE) in partnership with local jurisdictions; and
- Partnering with the State and USACE on regional sediment management planning.

1.2.1 Sediment Deficits

Beach preservation strategies have been developed in response to ongoing large-scale (regional) beach erosion, degradation of sandy beach habitat, bluff failure and collapse, loss of public and private property and life, and proliferation of installation of hard structures throughout the region. Researchers indicate that an annual loss of sand occurs at beaches in all geographic areas within the San Diego County region (Patsch and Griggs 2006). San Diego County coastal areas experience sediment deficits from effects of Oceanside Harbor, upstream flood control works, urban development, coastal bluff stabilization measures, harbor and lagoon sand trapping, increased wave energy since 1978, less beach nourishment since the 1960's, and active beach erosion. Deficits are unequal in the region and occur mainly at San Diego North County and South County (Imperial Beach).

Sediment budgets are the relative balance of sediment inputs to and outputs from a littoral cell. The study area encompasses three littoral cells, which include South Oceanside, Mission Bay, and Silver Strand, as shown in Figure 2.

Littoral cells are geographic areas within which sediment moves along the coast and which are bordered by relatively impassable physical boundaries on their up- and downcoast ends. The sediment budget status of each littoral cell within the project area is as follows:

- The southern Oceanside Littoral Cell is characterized by a deficit of nearly 60,000 cubic yards of sand per year (cy/yr) (Patsch and Griggs 2006).

- The Mission Bay Littoral Cell is in a deficit of 10,000 cy/yr according to the USACE (1991), and nearly 40,000 cy/yr according to Patch and Griggs (2006).
- At South County, the deficits in the Silver Strand Littoral Cell range from 65,000 cy/yr at the Tijuana River Delta to 40,000 cy/yr at Silver Strand (Patsch and Griggs 2006)

The specific sediment budget condition of the littoral cells within the study area and nourishment quantities needed for both restoration and maintenance to remedy the deficits according to the Shoreline Preservation Strategy (SANDAG 1993) are shown in Table 1.

Table 1. Coastal Sediment Deficits within the San Diego Region

Littoral Cell	Sediment Budget Condition	Nourishment Quantity Needed for Restoration* (cy)	Nourishment Quantity Needed for Maintenance (cy/yr)
Southern Oceanside	Negative	25,000,000	320,000
Mission Bay	Equilibrium to slightly negative	500,000 to 6,200,000	5,000
Silver Strand	Negative	3,000,000	90,000
Region-wide	**Negative**	**28,500,000 to 34,200,000**	**415,000**

Source: SANDAG Shoreline Preservation Strategy 1993

*Quantities would provide 200-foot wide beaches to the study area, which to a width adequate to provide 100-year storm protection to the coastline.

As a result of these deficits, the SPS (SANDAG 1993) recommended beach widening in the region by adding large fill quantities of up to approximately 30 million cubic yards of sand on the region's beaches as an initial restoration effort, followed by maintenance with 415,000 cy/yr of sand.

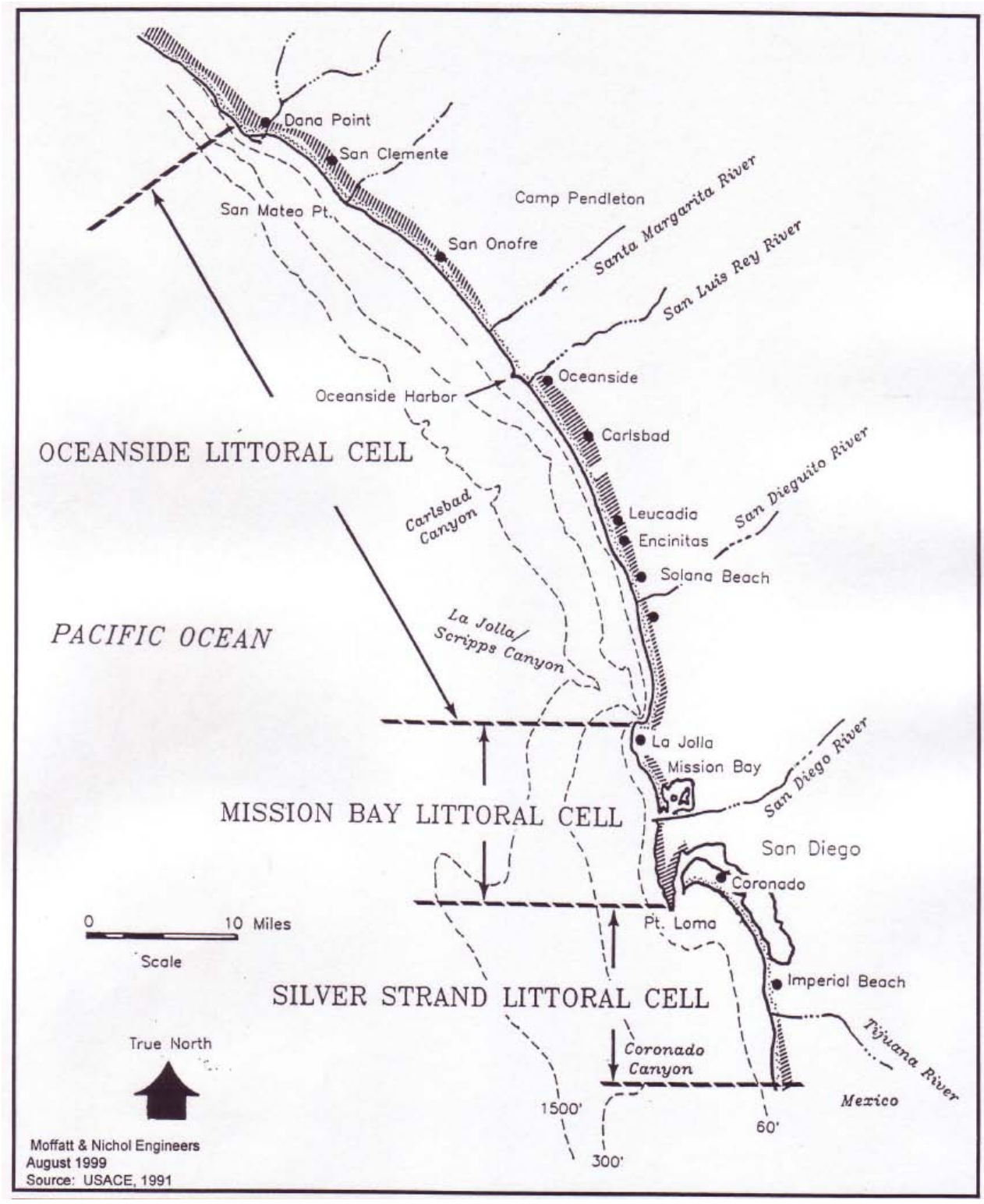

Figure 2. Littoral Cells within the CRSM Plan Area

1.2.2 Existing and Future Beach Nourishment Projects and Programs

Existing beach nourishment projects and programs have been and are currently being implemented in the San Diego region. The CRSM Plan aims to coordinate these separate efforts and to establish sand placement quantity targets to restore sediment supply to the littoral cells of the region. These existing programs include the San Diego Regional Beach Sand Projects and the Sand Compatibility Opportunistic Use Program described below.

- **Regional Beach Sand Projects (RBSP)** – RBSPs are conducted by SANDAG with financial support from the State and local jurisdictions. These projects utilize offshore borrow sites for nourishment in the form of beach berms. The first RBSP (RBSP I) took place in Spring/Summer 2001 when 2.1 million cubic yards of offshore sand was dredged and hydraulically pumped to 12 beaches throughout the San Diego region. Extensive monitoring efforts were conducted before, during, and following the placement to evaluate impacts of the project over a period of five years. A follow-up RBSP (RBSP II) is planned for 2011/2012 implementation and would generally repeat the 2001 effort.
- **Sand Compatibility Opportunistic Use Program (SCOUP) Plan and Opportunistic Beach Fill Programs**– The SCOUP I Plan was prepared by Moffatt & Nichol in 2006 for SANDAG and presented a pilot study project for the City of Oceanside. This program's goal was to develop a streamlined permitting process for the use of upland and dredged sand sources for the purposes of beach nourishment. Following the pilot study project, the program is in the process of being implemented by several other coastal cities within the San Diego region in a program referred to as SCOUP II. Cities participating in this program include Encinitas, Solana Beach, Coronado, and Imperial Beach. All SCOUP programs are currently pending resource agency approval. The City of Carlsbad has an approved opportunistic beach fill program consistent with the SCOUP Plan; however, this program was permitted and approved under a separate effort prior to the SCOUP I and II programs. These opportunistic beach fill programs within the region (once approved) would allow individual beach nourishment projects to take place at eight beach sites within the six participating jurisdictions with sand quantities ranging from 75,000 cy/yr to 150,000 cy/yr. Since the programs propose the placement of upland sand sources, the percentages of fines for the programs may reach up to 25% provided materials meet site-specific volume criteria. The programs establish placement timing and monitoring programs for each jurisdiction to minimize environmental impacts from individual beach fill projects.
- **Federal Shoreline Protection Projects** – Two federal (USACE) shoreline protection projects are currently being planned in the San Diego region. These projects are within the Cities of Encinitas/Solana Beach and the City of Imperial Beach and are being partnered by these local jurisdictions. The Encinitas/Solana Beach project is currently in the study stage and is currently evaluating beach nourishment as an alternative for shore protection of the region. The Imperial Beach project is an authorized shore protection project that includes beach nourishment with re-nourishment, as needed, for 50 years.

2.0 Purpose and Need

As discussed in Section 1.2, the SANDAG's SPS determined that the San Diego region is in a sediment deficit, which would require a placement of approximately 30 million cy to restore the region, and 415,000 cy/year to maintain this restored condition. The overall purpose of the CRSM Plan is to provide beach nourishment to the region's coast, while providing a beneficial reuse option for surplus sediment suitable for placement within the coastal zone. Other proposed project purposes include:

- Reduce the proliferation of protective shoreline structures;
- Sustain economics, recreation, and tourism;
- Enhance public safety and access;
- Restore coastal sandy habitats throughout the region; and
- Protect infrastructure and property.

The need for the CRSM Plan is to manage the current uncoordinated sediment management activities within the region on a project-specific basis. The Plan outlines various strategies to deliver sand to critical erosion areas in need of sediment. The need for sediment management is also driven by an estimated sea-level rise rate locally of roughly three feet per century (with broad ranges depending on the source considered), or 0.36 inches per year (IPCC 2007). Possible rates vary between regions, and estimates also vary between agencies. A recent study issued by the Pacific Institute (2009) offers a rate of up to 55 inches over 100 years. The effect of sea level rise will cause further narrowing of beaches as water levels rise relative to land elevations. This Plan offers a vision for the 50-year future. Sea level rise over that 50-year timeframe will be less than that predicted over the next 100-years, yet it is an important factor that needs to be considered for project designs.

Coastal sediments are basically sequestered offshore as ocean water levels rise relative to land. Therefore, coastal sand losses and narrowing of beaches will accelerate into the future if no action is taken. Regional sediment management is one mechanism to counter the effects of sea level rise and maintain functional sandy beach areas. Restoring beaches (with sediment management devices) is the most effective method of protecting against the detrimental effects of sea level rise. SANDAG is committed to maintaining beaches as an approach to counter sea level rise. A CRSM Plan is therefore needed to address associated effects of maintaining the region's beaches, thereby addressing impacts associated with sea level rise. The effects of sea level rise on this Plan may be that the quantities of sediment anticipated to be necessary to restore the region may have to increase over time, with more gradual increases over 50 years, and greater increases beyond that timeframe.

Detailed designs of individual projects as they come on-line should be done in the future in consideration of sea level rise. This is a planning document rather than an engineering design document so detailed analyses of effects of sea level rise are not presented. However, as the Plan moves forward and projects are proposed, then detailed analyses of sea level rise and project designs must occur for environmental review, permitting, and engineering for construction. This Plan is intended to be adapted and updated over time using results of monitoring. Monitoring results will include effects of sea level rise. For the Plan to be effective, future iterations and

designs must include any modifications to address effects of sea level rise on specific project actions.

3.0 Description of Proposed San Diego CRSM Plan

The CRSM Plan proposes a series of dredging, beach nourishment, and sand management devices to be implemented over time within the San Diego region. In addition, the Plan addresses the re-use of surplus sediment for beach nourishment to offset coastal erosion. The sediment to be re-used would be derived from a variety of sources such as upland, coastal (lagoon/harbor), and offshore. The sources of sediment to be utilized by the plan are from areas where sediment is in surplus and/or is the by-product of an individual project (i.e., private development, lagoon restoration, etc). The CRSM Plan would utilize these sources for the purposes of beach nourishment at pre-determined receiving beaches within the region.

The CRSM Plan identifies beach nourishment quantity targets for the region that would be met by implementation of the Plan. These targets are derived from sediment budgets, as discussed above. The Plan proposes future nourishment rate targets to at least equal loss rates, but also sufficient to result in gains. The Plan proposes to add one million cy/yr of sand to the region to result in the targeted 30 million cubic yard gain in approximately 50 years or less (without any artificial structural sand retention), assuming no increase in the existing sediment loss rate. Artificial sand management devices would reduce this target amount.

The U.S. Army Corps of Engineers, Los Angeles District (USACE) is the federal lead agency for the project and has prepared this PEIS in compliance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code 4321, as amended). The San Diego Association of Governments (SANDAG) is the local sponsor for this PEIR, which has been prepared in accordance with the California Environmental Quality Act (CEQA) of 1970 (Public Resources Code, Sections 21000-21177).

3.1 Receiving Beaches

A total of 27 receiving beaches are proposed as part of this CRSM Plan. The majority of these sites have been used previously or have been previously identified for sand placement by regional (i.e., SANDAG RBSP) or local projects (SCOUP & Lagoon Maintenance). A total of seven sites are newly proposed as part of this CRSM Plan, which include two beach and five nearshore placement sites. Three sites, including one beach and two nearshore, include newly proposed expansions of site boundaries.

A combination of nearshore and onshore receiver sites are proposed near bays and lagoons to provide greater flexibility for managing a broader range of environmentally suitable materials resulting from maintenance dredging and/or restoration activities. In less environmentally constrained areas, nearshore sites also may increase flexibility to address coastal erosion with placement of environmentally suitable materials from other sediment sources.

All CRSM Plan action alternatives would consist of utilization of 27 receiving sites for beach nourishment. The sites are located to allow sand placement from a mixture of sediment sources identified by the CRSM Plan, as shown in Table 2 below.

Table 2. CRSM Plan Sites for All Sand Sources

Receiver Sites	Location	Prior Site / Modification of Prior Site	Probable Sediment Source(s)
South Oceanside	On-beach	Prior site; however, extended further northward	Harbor maintenance, upland, offshore and bypassing, Buena Vista Lagoon maintenance and/or restoration
South Oceanside	Nearshore	Prior site; however, the site has been enlarged	Harbor maintenance, upland, offshore and bypassing, Buena Vista Lagoon maintenance and/or restoration
North Carlsbad State Beach	On-beach	Prior site	Offshore, Buena Vista Lagoon restoration and maintenance
Agua Hedionda	On-beach	Prior site	Agua Hedionda Lagoon maintenance
South Carlsbad State Beach	On-beach	Prior site	Offshore and upland
Batiquitos Lagoon Beach - Carlsbad	On-beach	Prior site	Offshore, Batiquitos Lagoon maintenance
Batiquitos Beach - Encinitas	On-beach	Prior site	Offshore, upland
Batiquitos	Nearshore	New site	Batiquitos Lagoon maintenance
Leucadia	On-beach	Prior site	Offshore
Moonlight Beach	On-beach	Prior site	Offshore, upland
Cardiff State Beach	On-beach	Prior site	Offshore, upland, San Elijo Lagoon restoration and maintenance
Cardiff	Nearshore	New site	San Elijo Lagoon future restoration and maintenance
Fletcher Cove	On-beach	Prior site	Offshore, upland

Receiver Sites	Location	Prior Site / Modification of Prior Site	Probable Sediment Source(s)
San Dieguito Lagoon	Nearshore	New site	San Dieguito Lagoon future restoration and maintenance
San Dieguito Lagoon	On-beach	New site	San Dieguito Lagoon maintenance
Del Mar	On-beach	Prior site	Offshore
Torrey Pines State Beach	On-beach	Prior site	Offshore, upland, Los Peñasquitos Lagoon future restoration and maintenance
Torrey Pines State Beach	Nearshore	New site	Los Peñasquitos Lagoon future restoration and maintenance
Mission Beach	On-beach	Prior site	Offshore
Mission Beach	Nearshore	New site	Mission Bay maintenance, offshore
Ocean Beach	On-beach	New site	Upland
Coronado Beach	On-beach	Prior site	Upland
Coronado Beach	Nearshore	Prior site	San Diego Bay maintenance, offshore
Imperial Beach	On-beach	Prior site	Offshore, upland
Imperial Beach	Nearshore North	Prior site	San Diego Bay maintenance, offshore
Imperial Beach	Nearshore South	Prior site; however, the site has been enlarged	San Diego Bay and Tijuana Estuary maintenance, offshore
Border Field State Park	On-beach	Prior site	upland – debris basins

3.2 CRSM Plan Sediment Sources

The CRSM Plan would utilize a number of sediment sources in order to meet the target annual regional beach nourishment rates. These sources are divided into the following three categories:

- Upland – Upland soil, flood control basin / corridor, dams;
- Coastal - Lagoon Restoration and Bays/Harbors; and
- Offshore.

As shown in Table 3 below, the proposed sources vary in quality, quantity available, timeframe of availability and ownership.

Table 3. Existing Sediment Sources

Property	Upland Soil	Flood Control Basin/Corridor & Dams	Lagoon	Bays/Harbors	Offshore Ocean
Grain Size	Narrow range, but more fines near surface (25%+)	Broad range, rocks to silts, also debris	Narrow range, mainly fine to medium sand	Moderate range, sandy to silty	Narrowest range, medium sand
Quality / Chemistry	Potential contaminants in top 5 feet	Potential contaminants throughout	Typically clean	Clean to contaminated	Clean
Quantity	Very small to Small, (<25,000 to 100,000 cy)	Very small (<25,000 cy); Dams can be significant (500,000 cy)	Small-Moderate * (25,000 to 500,000 cy)	Moderate to large* (100,000's to millions cy)	Large (>1,000,000 cy)
Typical Frequency	Annually or semi-annually	Annually to bi-annually	Annually to every 3 years	Annually to every 5 or more years	Every 5 to 10 years or more

Note: Sources must be free of contamination and meet sediment compatibility criteria of receiver sites; restrictions on placement location and/or quantity may apply depending on sediment characteristics.
*Restoration or development may generate very large volumes

A complete inventory of sediment sources identified as potential sources by the CRSM Plan is provided in Table 2. These sources were identified through a public outreach component of the CRSM Plan and were generally provided by members of the public or local jurisdictions that were aware of on-going projects, fixed frequency maintenance or future projects with surplus sand. This list is not comprehensive; rather it shows basic sources that could be expanded. These sources are divided into upland, coastal and offshore categories as described below.

3.2.1 Upland Sources

Upland sources are generally most numerous within drainage courses associated with water-related infrastructure (flood control). However upland sources consist of development sites, rivers, flood control channels, sediment detention basins, dams, and roadway widening projects. Potential upland sources of this type to the CRSM Plan area are listed in Table 4.

3.2.2 Coastal Sources – Lagoons and Harbors

Six lagoons, one estuary, and three harbors exist within the CRSM Plan region**.** Lagoons within the region that may or do provide sand either from maintenance dredging and/or restoration include the following (from north to south):

- Buena Vista Lagoon in Oceanside/Carlsbad (Potential Restoration and/or Maintenance Source);
- Agua Hedionda Lagoon in Carlsbad (Annual Maintenance Ongoing);
- Batiquitos Lagoon in Carlsbad (Two Year Maintenance Ongoing);
- San Elijo Lagoon in Encinitas/Solana Beach (Potential Restoration and/or Maintenance Source);
- San Dieguito Lagoon in Del Mar (Potential Restoration and/or Maintenance Source);
- Los Penasquitos Lagoon in San Diego (Potential Restoration and/or Maintenance Source); and the
- Tijuana River Estuary (Potential Restoration and/or Maintenance Source).

Harbors within the CRSM Plan area that may or do provide sand from maintenance dredging include the following (from north to south):

- Oceanside Harbor (Annual Maintenance Ongoing)
- Mission Bay (Potential Maintenance Source)
- San Diego Bay (Periodic Maintenance Source)

Although lagoon and harbor maintenance activities provide sand to the beach, this sand source is not considered a new source of sand to the region or littoral cell because the activity is essentially re-introducing entrained sediment from the lagoon or harbor back into the littoral system. However, a lagoon restoration project would be considered a new source of sediment since the material is not currently active in the littoral cell.

3.2.3 Offshore Sources

Offshore sediment sources exist along the entire reach of the CRSM Plan region as have been previously identified by SANDAG and used for RBSP I. Ten offshore borrow sites were previously investigated as part of this project. These sites are as follows (from north to south):

- SO-9 off Oceanside harbor to the north;
- SO-8 off Oceanside harbor to the west;
- AH-1 off North Carlsbad (near Agua Hedionda Lagoon);
- SO-7 off South Carlsbad (near Batiquitos Lagoon);
- SO-6 off South Encinitas (near San Elijo Lagoon);
- SO-5 off Del Mar (near San Dieguito Lagoon);
- SO-4 off Torrey Pines (near Los Penasquitos Lagoon);

- MB-1 off Mission Beach;
- SS-1 off Imperial Beach north end (also referred to as USACE Area A); and
- SS-2 off the Tijuana River Estuary.

As part of the upcoming SANDAG Regional Beach Sand Project in 2011 or 2012 (RBSP II), representing essentially a duplicate to RBSP I, some of the same sites and three new sites are being investigated. The new sites and locations are as follows:

- SM-1 off the Marine Corps Base (MCB) Camp Pendleton (near the Santa Margarita
- River) and just north of Oceanside Harbor (both offshore and nearshore);
- TP-1 off south Torrey Pines (near Black's beach); and
- ZS-1 of Coronado (on Zuniga Shoal).

Table 4. CRSM Plan Sediment Sources

SOURCE DESIGNATION	LOCATION	Source Name	QUANTITY (Cubic Yards)	Distance to Coast (Miles)	OWNERSHIP	DATE AVAILABLE	CONTACT	PHONE
North County Coastal								
NC-CP-SMR	Oceanside	Camp Pendleton - Santa Margarita River	--	2-5	U.S. Marine Corps	Unknown	Viola Innis	(760) 725-7245
NC-CP-NS	Oceanside	Camp Pendleton - Nearshore		0	State Lands Commission	Unknown	Ken Foster (SLC)	(916) 574-2555
NC-CP-DMBB	Oceanside	Camp Pendleton - Del Mar Boat Basin	2,500	<1	U.S. Marine Corps	September 2008	Robert Grove (SCE)	(626) 302-9735
NC-OS-H	Oceanside	Oceanside Harbor	201,000 CY/YR historic bypass rate	<1	City of Oceanside	Annually	Don Hadley (Oceanside)	(760) 435-4000
NC-OS-SML	Oceanside	Santa Margarita Lagoon	Unknown	<1	City of Oceanside	Unknown	Don Hadley (Oceanside)	(760) 435-4000
NC-OS-LAC	Oceanside	Loma Alta Creek Maintenance	Unknown	1	City of Oceanside	Unknown	Don Hadley (Oceanside)	(760) 435-4000
NC-OS-ELC	Oceanside	El Corazon Project	Unknown	2	Private Developer	Unknown	Don Hadley (Oceanside)	(760) 435-4000
NC-OS1	Oceanside	Oceanside Beach Resort	Unknown	<1	Private Developer	Unknown	Don Hadley (Oceanside)	(760) 435-4000
NC-CB1	Carlsbad	Poinsettia Train St/Multi-Use	30,000 - 40,000	1	Private Developer	Unknown	Steve Jantz (Carlsbad)	(760) 602-2738
NC-BVL	Carlsbad	Buena Vista Lagoon Restoration	300,000 – 600,000	1-3	City of Carlsbad/Oceanside	2008-2009	Jerry Hittleman (Oceanside)	(760) 435-3520
NC-CB2	Carlsbad	City Detention Basins	<12,000		City of Carlsbad	Unknown	Steve Jantz (Carlsbad)	(760) 602-2738
NC-CB-AHL	Carlsbad	Agua Hedionda Lagoon	Unknown	<1	City of Carlsbad	Bi-annually	Steve Jantz (Carlsbad)	(760) 602-2738
NC-CB-EC	Carlsbad	Encinas Creek Maintenance	Unknown	<1	City of Carlsbad	Unknown	Steve Jantz (Carlsbad)	(760) 602-2738
NC-CB-AHC	Carlsbad	Aqua Hedionda Creek Maintenance	Unknown	5	City of Carlsbad	Unknown	Steve Jantz (Carlsbad)	(760) 602-2738
NC-CB-BL	Carlsbad	Batiquitos Lagoon	83,000 Flood bar qty in 4 yrs growth	1-5	California Department of Fish and Game	Every 5 yrs	Tim Dillingham	(858)467-4204
NC-CB1	Carlsbad	Hotel Development	Unknown	<1	Private Developer	Unknown	Steve Jantz (Carlsbad)	(760) 602-2738
NC-CB2	Carlsbad	Condo Development	Unknown	<1	Private Developer	Unknown	Steve Jantz (Carlsbad)	(760) 602-2738
NC-ENC1	Encinitas	Saxony Detention Basin Maintenance	10,000	2	City of Encinitas	Unknown	Kathy Weldon (Encinitas)	(760)633-2632
NC-ENC2	Encinitas	Encinitas Resort Hotel	50,000	<1	Private Developer	Unknown	Kathy Weldon (Encinitas)	(760)633-2632
EN-ENC3	Encinitas	Batiquitos Lagoon Detention Basin	Unknown	2	City of Encinitas	Unknown	Kathy Weldon (Encinitas)	(760)633-2632
NC-ENC4	Encinitas	Pacific Station Project	37,000	<1	Private Developer	November 2008	Kathy Weldon (Encinitas)	(760)633-2632
NC-SEL	Cardiff	San Elijo Lagoon Restoration	800,000	1-3	County of San Diego	Unknown	USACE	(213) 452-3675
NC-SB1	Solana Beach	Mixed-Use / Train Station Project	100,000	1	Private Developer	mid-2006 to 2008	Leslea Meyerhoff (Solana Beach)	(858) 720-2440
NC-SB2	Solana Beach	I-5 Widening	Unknown	3	Caltrans	Unknown	Bruce April	(858) 616-6614
NC-SDL	Del Mar	San Dieguito Lagoon Restoration	78,000	1-5	SoCal Edison Project	2008-2009	Hany Elwany	(858) 459-0008
NC-TPR	North San Diego	Torrey Pines Retention Basin	56 & I-5	<1	CA State Parks	Unknown	Denny Stoffer	(760) 720-6375
NC-LPL	North San Diego	Los Penasquitos Lagoon Restoration	10,000 - 20,000	1-5	Unknown	Unknown	Hany Elwany	(858) 459-0008
NC- I-5	North San Diego	Caltrans I-5 Widening	Unknown	1-3	Caltrans	Unknown	Unknown	
NC-RR	North San Diego	LOSSAN Railroad Widening	Unknown	1-2	North County Transit District	Unknown	Unknown	

Table 4. CRSM Plan Sediment Sources **(Continued)**

SOURCE DESIGNATION	LOCATION	Source Name	QUANTITY (Cubic Yards)	Distance to Coast (Miles)	OWNERSHIP	DATE AVAILABLE	CONTACT	PHONE
North County Inland								
NI-POW	Poway	Flood Control Channels	20,000 cy/yr		City of Poway	Unknown	Unknown	
NI-NS-1	Bonsal	San Luis Rey River	250,000 - 500,000			3-5 years	Kevin Quinn (City San Diego)	
NI-LHR	County of San Diego	Lake Hodges	7,300,000	12 (Oceanside)	Nelson & Sloan	Now	Fred Colin	(760) 744-7130
NI-LSM	San Marcos	Lake San Marcos	Unknown	>10	City of San Diego Water Dist.	Unknown	Rosalva Morales (SDWD)	(619) 527-3119
NI-SM1	San Marcos	San Marcos Sediment Basins	Unknown	>10	City of San Marcos - Public Works	Unknown	Paul Buckley	
NI-LSR	County of San Diego	Lake Sutherland Reservoir	2,600,000	>10	Unknown	Unknown	Unknown	
NI-SLR	County of San Diego	I-76 / I-15 Widening	30,000	>10	Suket Construction	Now	Scott Emery	(760) 754-9104
Central County Coastal								
CC-SDB	North Island	Navy Construction Projects	30,000	<1	Navy			
CC-MML	Miramar	Miramar Landfill	Less than 100,000		Navy	Unknown	Ed Kleeman (Coronado)	(619) 522-7329
CC-SDF	County-wide	Flood Control Channels	500,000	10-30	City of San Diego	Unknown	Joseph Corones	(619) 492-5034
CC-MB	City of San Diego	Mission Bay	Unknown	1-2	County of San Diego	Unknown	Marianne Green (City San Diego)	
Central County Inland								
CI-SDC	Ramona/Spring Valley	Flood Control Channels	100,000	>10	County of San Diego	Unknown	Unknown	
CI-ECR	Alpine (near)	El Capitan Dam Maintenance	9,600,000	>10	County Water Authority	Unknown	Sid Tesoro (San Diego (County)	(858) 232-5151
CI-SVR	Blossom Valley	San Vicente Dam Maintenance	3,200,000	>10	County Water Authority	Unknown	Rosalva Morales (SDWD)	(619) 527-3119
CI-SLR	Ramona/Julian	Sutherland Dam Maintenance	92,000	>10	County Water Authority	Unknown	Rosalva Morales (SDWD)	(619) 527-3119
CI-LLR	County of San Diego	Loveland Lake Reservoir	Unknown	>10	County Water Authority	Unknown	Rosalva Morales (SDWD)	(619) 527-3119
CI-LPV	County of San Diego	Lake Palo Verde	Unknown	>10	County Water Authority	Unknown	Rosalva Morales (SDWD)	(619) 527-3119
South County								
S-TJ	Imperial Beach / County of San Diego	Goat Canyon Sediment Basins – Border Field State Park	60,000	1	CA State Parks	2008-2009	Clay Phillips	(619) 575-3613 x303
S-TJ-1	Imperial Beach / County of San Diego	Tijuana River Valley Restoration	500,000	1	CA State Parks	Unknown	Clay Phillips	(619) 575-3613 x303
S-CV	Chula Vista	Detention Basins	Unknown	>10	County of San Diego	Immediately	Unknown	Unknown
S-CVM	Chula Vista	Chula Vista Marina	300,000	5-10	City of Chula Vista	Unknown	Dave Byers (City of Chula Vista)	619-691-5021
S-SP	Chula Vista	South San Diego Salt Pond	Unknown	5-10	City of Chula Vista	Unknown	Unknown	Unknown
S-SR	County of San Diego	Sweetwater Reservoir	Unknown	10-30	County Water Authority	Unknown	Unknown	Unknown
S-SDB	City of San Diego	San Diego Bay	Up to 400,000	5	ACE, Navy, Port of San Diego	Unknown	Unknown	Unknown
S-C1	City of Coronado	Sea Coast Inn	30,000	<1	Private Developer	2008-2009	Unknown	Unknown
Offshore								
SM-1	Offshore	SM-1	~2,000,000 suitable	NA	State of California	Now	Ken Foster (SLC)	(916) 574-2555
SO-9	Offshore	SO-9	873,000 Unsuitable, very fine sand	NA	State of California	Now	Ken Foster (SLC)	(916) 574-2555

Table 4. CRSM Plan Sediment Sources (Continued)

SOURCE DESIGNATION	LOCATION	Source Name	QUANTITY (Cubic Yards)	Distance to Coast (Miles)	OWNERSHIP	DATE AVAILABLE	CONTACT	PHONE
Offshore (continued)								
SO-7	Offshore	SO-7	Depleted after SDRBSP	NA	State of California	NA	Ken Foster (SLC)	(916) 574-2555
SO-6	Offshore	SO-6	688,000 Remaining after SDRBSP	NA	State of California	Now	Ken Foster (SLC)	(916) 574-2555
SO-5	Offshore	SO-5	5,480,000 Remaining after SDRBSP	NA	State of California	Now	Ken Foster (SLC)	(916) 574-2555
TP-1	Offshore	TP-1	Mostly fine grain sand / high silt content	NA	State of California	Now	Ken Foster (SLC)	(916) 574-2555
SO-4	Offshore	SO-4	1,500,000 Fine grain	NA	State of California	Now	Ken Foster (SLC)	(916) 574-2555
MB-1	Offshore	MB-1	25,737,000 Remaining after SDRBSP	NA	State of California	Now	Ken Foster (SLC)	(916) 574-2555
SS-1	Offshore	SS-1	7,592,000 Unsuitable, very fine w cobbles	NA	State of California	Now	Ken Foster (SLC)	(916) 574-2555
ZS-1	Offshore	ZS-1	Mostly fine grain sand / high silt content	NA	State of California	Now	Ken Foster (SLC)	(916) 574-2555
SS-1	Offshore	SS-1	~6,000,000 suitable	NA	State of California	Now	Ken Foster (SLC)	(916) 574-2555

3.3 Construction Methods

Construction methods would vary depending on the sediment source, receiver site conditions and the desired function of the beach fill. The CRSM Plan proposes three different beach fill designs including: beach berm, surfzone and nearshore placements. Methods to construct these beach fill designs from differing sources are described in this section.

3.3.1 Beach Placement Types

Once material is delivered to the beach via pipe, truck or dredge, the sand may be placed using one or more of the three placement methods described below contingent on the receiver site.

3.3.1.1 Beach Berm Placement

Sand deposited on the beach would be spread on the back beach using scrapers, loaders and bulldozers to create a level surface extending from the back of the beach toward the ocean. The beach berm would then slope gradually into the water, generally at a slope of 1:10 to 1:20 (rise: run). The elevation, width, length and slope of the beach berm would vary depending upon the quantity of material to be placed and its qualities, as well as the condition of the beach at the time of material placement. Placement volumes may vary depending on receiver site and season.

3.3.1.2 Surfzone Placement

Higher fines content material will generally be required to be placed in the surf zone via trucks, loaders or slurry. Sand would be delivered to the beach and carried by trucks or wheeled loaders to the water's edge, then pushed as far seaward as possible by bulldozers (e.g., <+1 to +2 ft MLLW). The sand would not be pushed across the beach, or driven on, or otherwise handled in such a way as to cause compaction. At low tide, the material would be pushed as far seaward as possible and left in a long, linear dike parallel to the coast so that it would be reworked by waves during the following rising tide. The length, height (e.g., 2-4 ft), and width of sand mounds or dike would depend upon the quantity and qualities of the material to be placed and season, but would not exceed what can be reworked by waves over a daily tidal cycle. Therefore, the sand would have to be placed in increments if the quantity to be placed exceeded the rate of daily reworking by waves.

3.3.1.3 Nearshore Placement

Less-than-optimum material would be trucked to the site, then mixed with seawater in a pit at the beach and sent in a slurry mixture via the pipe into the nearshore. Two small submersible pumps would be required: one to pump seawater into a couple of portable hoppers or containers (like Baker tanks) on the beach and another in the hopper to pump the slurry to the ocean. Trucks would dump their loads into the water-filled hopper and leave. The pumps would be up to 50 horsepower diesel engines. Electric ones are suitable if connections are available. The pumps would be placed in the hopper(s) by crane. The line from the ocean to the hopper with seawater would be 4 to 6 inches in diameter. The line from the hopper to the ocean for the slurry would be 6 to 8 inches in diameter. The pump would operate at a small hole (5 to 10 feet deep) at the back of the beach filled with ocean water. The pumps would be stationary, but the hoses would be

flexible. While discharging, the hose head would be weighted to remain close to the bottom. This would help to reduce turbidity. The hose itself would be marked with floats to avoid navigational conflicts. In addition, a clear area would be required along the length of the hose to avoid damage.

Nearshore placement could also be constructed via a dredge operation. Most likely this would be from lagoon or harbor maintenance activities and would utilize a cutterhead suction dredge. This dredge method is discussed in detail in Section 3.3.2.

3.3.2 Construction Methods for Offshore Sources

Material from offshore sources would be obtained via a cutterhead or hopper dredge operation. The type of dredge operation would be dependent on the location of the source relative to the receiving beach.

The hopper dredge is a self-contained vessel that loads sediment from an offshore borrow site then moves to a receiver site for placement. The hopper dredge contains two large arms that have the ability to drag along the ocean floor and collect sediment. The vessel can hold approximately 2,000 to 5,000 cy of sediment per load. The hopper dredge can generally reach within approximately 0.5 mile of shore to offload, unless booster pumps are placed offshore to increase its pumping distance. At this position, the hopper dredge connects to a floating or submerged pump line to shore. The vessel then discharges a mixture of sediment as a slurry onto the receiver site where the sands settle and water runoff returns to the sea. Generally, construction methods include measures (e.g., temporary dikes, placement location, pump rate) to control turbidity generated by the return water. Earth moving equipment is used to spread sand into a beach berm.

A cutterhead suction dredge is the other dredge technology and it is similar to a hopper dredge in that it uses a long arm that extends down to the sea floor to dredge sediment. However, a cutterhead dredge breaks up sediment material along the seafloor, then uses a vacuum mechanism to suck up sediment into an intake line and pump it directly to shore through a discharge line. Unlike the hopper dredge, the cutterhead dredge remains relatively stationary at the dredge site for the entire operation while pipelines carry the material.

For both dredge vessels, the floating portion of the dredge discharge line would be marked and lighted for navigation safety and a Notice to Mariners would be issued through the U.S. Coast Guard. The discharge line would be trucked or floated in segments to the appropriate placement locations and assembled using cranes and other equipment. The line may be either plastic (HDPE) or steel materials, or a combination of both depending on need and availability, and would be approximately 30 inches in diameter.

Booster pumps would be used approximately every 5,000 feet on longer reaches.

3.3.3 Construction Methods for Upland Sources

Source material from upland sources would most likely be delivered to the beach via truck. An approved trucking route from jurisdictions will need to be obtained prior to commencement of this operation. Trucks will generally utilize major arterials to reduce trucking noise on low traffic

streets as much as possible. Trucks will gain access to the receiving beaches through pre-determined and permitted access points.

3.3.4 Construction Methods for Lagoon and Harbor Sources

Source material from lagoons and harbors would likely be dredged to the receiving beach utilizing a hydraulic cutterhead suction dredge or a clamshell dredge with a barge. The hydraulic dredge method of construction is discussed in Section 3.3.2 above. The clamshell is a large bucket suspended by a cable from a crane on a barge. The clamshell is dropped in an open-jaw position to the seafloor, closed, and raised to the surface. The material grabbed in the bucket is manually dumped onto the barge and transported to the placement site. The barge may drop the sediment from its hull or pump it off to the beach.

3.4 Construction Work Windows

Schedule and/or other measures routinely are specified in permit requirements to protect sensitive species during construction associated with dredging and discharge projects (Reine et al. 1998). Construction work windows refer to periods when construction is allowed, limited, and/or restricted. Construction work windows also may be specified by local jurisdictions to minimize interference to high use public recreational areas.

Local SCOUP and other opportunistic sand programs identify the fall and winter seasons as the least constrained for conducting beach nourishment projects in San Diego County (Moffatt & Nichol 2006, Moffatt & Nichol 2000, EDAW 2008). Generally, sand placement during fall-winter minimizes potential effects to biological resources and avoids most of the sensitive use periods of managed and protected species such as California grunion, endangered California least tern, and threatened western snowy plover. In addition, recreational use of beaches is less intense during the winter. For these reasons, sand placement is generally encouraged during fall-winter. One exception is beach areas where snowy plovers may congregate overwinter (wintering concentrations).

Sand placement during spring-summer may be limited because of environmental and public recreation constraints. Local SCOUP and other opportunistic sand programs limit beach nourishment quantities and repetitive sand placement at the same location to protect biological productivity. Other protective measures may be required (e.g., monitoring) if sensitive species are present during this period. In addition, sand placement may be fully restricted at some receiver sites during the summer “high beach use season” (June through early September, or Memorial Day through Labor Day) depending on the city.

Table 5 summarizes sand volume allowances for placement of sand at receiver sites with opportunistic sand and SCOUP programs. Projects associated with maintenance dredging, lagoon restoration, regional beach nourishment, and/or shoreline protection may use the same and/or a different combination of receiver sites than listed in Table 5 (see Table 8.). In addition, volume allowances for receiver sites may vary depending on type of activity and project location.

Table 6 summarizes environmental constraint periods for relevant managed and sensitive species associated with sand placement on beaches. Construction work windows are relatively unconstrained during fall-winter unless in areas with wintering concentrations of snowy plover. Construction work windows in spring-summer are constrained by California grunion if suitable beach habitat to support spawning is present. Additional constraints also may apply if sites are located nearby nesting sites of California least tern and/or snowy plover or within critical habitat of snowy plover. Other species constraints may apply to maintenance or dredging projects conducted in bays and lagoons; while those projects may represent sand sources for beneficial reuse at the beach, those activities are subject to separate environmental review and permitting and are not addressed further in the CRSM Plan.

Table 5. Summary of Opportunistic Upland Sand Placement Allowances

Receiver Site	Program	Silt/ Clay Fines (%)	Maximum Quantity (cy)			
			Total Volume (cy) per Year	Fall/ Winter	Spring	Summer
S. Oceanside	SCOUP I	≤ 25	150,000	150,000	50,000	
		26-45		50,000	0	0
S. Carlsbad	OBFP	0-15%	150,000	150,000	40,000 (20,000 initially)	10,000 (5,000initially)
		16-25%		150,000	0	0
Batiquitos	SCOUP II	0-10%	120,000	120,000	25,000/mo	0
		11-25%		25,000/project	0	0
Moonlight	SCOUP II	0-10%	150,000	150,000	25,000/mo	0
		11-25%		25,000/project	0	0
Cardiff	New Site	≤ 25	TBD	TBD	TBD	TBD
Fletcher Cove	SCOUP II	0-10%	150,000	150,000	25,000/mo	5,000
		11-25%		25,000	0	0
Coronado	SCOUP II	0-10%	100,000	100,000	25,000/mo	50,000 backshore North Beach only
		11-25%		0	0	0
Imperial Beach	SCOUP II	0-10%	75,000	75,000 (25,000/project)	25,000/mo	0
		11-25%		25,000	Nearshore only	Nearshore only

Note: Season definitions vary among different opportunistic programs
SCOUP I: (M&N 2006): fall-winter Sep 21-Mar 21, spring-summer Mar 22-Sepr 20
OBFP: City of Carlsbad (Moffatt & Nichol 2000): fall-winter = Sep 15-Mar 15, spring = Memorial -Labor Day, summer = Labor Day-Sep 15
SCOUP II: EDAW (2008) Fall-Winter = Sep 15-Feb 28, Spring = Mar 1-May 31, Summer = Jun 1- Sep 14

Table 6. Summary of Environmental Constraint Periods by Species and Season

Season	Month											
	J	F	M	A	M	J	J	A	S	O	N	D
Fall-Winter												
Spring												
Summer												
Species	**Relevant Sensitive Species Constraint Periods ***											
Grunion – spawning												
Least Tern – breeding												
Snowy Plover – breeding												
Snowy Plover - wintering												

* The highlighted sensitive species constraint periods are consistent with RGP 67 for beach nourishment using upland source materials in southern California. They start at the beginning of the first month and run to the end of the last month indicated. Constraint periods may differ (by up to two weeks) in their specification among local opportunistic and SCOUP Plans; for example start dates may be listed as March 1 or March 15 and end dates may be listed as August 31, September 15, or September 30 depending on species and source document. Standardization of constraint periods and work windows in future updates of the CRSM Plan is recommended.

For projects scheduled during the spring-summer construction window (between March 1 and September 30), pre-construction survey assessment and/or coordination with resource and regulatory agencies may be necessary consistent with Regional General Permit (RGP) 67 for beach nourishment (USACE 2006) and the SCOUP (Moffatt & Nichol 2006) to ensure no adverse impacts to sensitive resources. The following constraint distances and timeframes relevant to sand placement on beaches is specified in RGP 67:

- During the California grunion spawning season (March 1-August 31), habitat suitability to support spawning success must be assessed at beach receiver sites. If suitable, construction monitoring and appropriate protective measures would be required to ensure no adverse impacts to the species. Grunion monitoring during construction may be waived if habitat is unsuitable (e.g., extensive cobble cover, insufficient sand thickness, narrow beach width with substantial wave exposure across tides). This constraint would not apply to nearshore receiver sites because activities would occur during typical construction hours (7 a.m. to dusk) and grunion congregation and spawning runs to beaches occur at night.
- If a receiver site is located within 1,500 ft (500 yards) of snowy plover nesting areas, sand placement would be restricted during the breeding season (March 1 through September 30) unless otherwise coordinated in advance with the U.S. Fish and Wildlife Service and U.S. Army Corps of Engineers.
- If a receiver site is located within 3,000 ft (1,000 yards) of a California least tern breeding colony, sand placement would be restricted during the breeding season (April 1 through August 30) unless otherwise coordinated in advance with the U.S. Fish and Wildlife Service and U.S. Army Corps of Engineers.

Sediment management projects may require consultation between the USFWS and USACE under Section 7 of the Endangered Species Act (ESA) if activities would be nearby nesting sites of California least tern or western snowy plover during the breeding season or within critical habitat of snowy plover. For example, coordination with resource and regulatory agencies with agreed upon mitigation measures would be required prior to scheduling opportunistic projects within the above-noted constraint periods and/or distances for these species. The USFWS should be contacted to determine if consultation would be required for projects scheduled during the least tern breeding season because they may forage up to several miles from their nesting sites (USFWS 2009).

Pre-project coordination with resource and regulatory agencies may be necessary during the fall-winter construction window (October 1-February 28) for receiver sites located within identified snowy plover critical habitat and wintering areas. Although several potential wintering areas have been identified in San Diego County, available survey data indicate that actual use varies among sites and years (USFWS unpublished data). Because the snowy plover recovery plan acknowledges potential benefits to the species from beach nourishment, the primary concern is areas where snowy plovers may congregate. Coordination should include review of proximity to critical habitat and recent winter survey data, as available, and identification of whether additional mitigation measures (e.g., construction monitoring, appropriate protective measures) may be warranted.

Table 7 summarizes biological constraint periods relevant to CRSM Plan receiver sites addressed in this DOPAA based on reproductive season of relevant managed or protected species, proximity to California least tern and/or snowy plover nesting sites, and occurrence of snowy plover critical habitat. Receiver sites located within identified snowy plover wintering areas are also noted. Mitigation measures (e.g., monitoring, protective measures) may be necessary to conduct beach nourishment during constraint periods depending on project- and site-specific conditions.

Table 7. Summary of Environmental Constraint Periods for CRSM Plan Receiver Sites.

Receiver Sites	Month											
	J	F	M	A	M	J	J	A	S	O	N	D
	Constraint Periods											
S. Oceanside On-beach												
S. Oceanside Nearshore												
North Carlsbad On-beach*												
Agua Hedionda On-beach*												
South Carlsbad On-beach*												
Batiquitos On-beach **												
Batiquitos Nearshore												
Leucadia On-beach												
Moonlight On-beach												
Cardiff On-beach *												
Cardiff Nearshore												
Solana Beach On-beach												
San Dieguito Nearshore												
San Dieguito On-beach*												
Del Mar On-beach*												
Torrey Pines On-beach*												
Torrey Pines Nearshore												
Mission Beach On-beach*												
Mission Beach Nearshore												
Ocean Beach On-beach*												
Coronado On-beach**												
Coronado Nearshore												
Imperial Beach On-beach												
Imperial Beach Nearshore (North)												
Imperial Beach Nearshore (South)												
Tijuana Estuary On-beach**												

Grunion - spawning Least Tern - breeding Snowy plover - breeding

** Snowy Plover critical habitat * Snowy Plover wintering area

Note 1: Projects conducted March 1 - September 30 may be constrained by sensitive species if present within and/or nearby site.

Note 2: Receiver sites noted by asterisks are within or immediately adjacent to critical habitat (**) or potential wintering areas (*) of snowy plover and should include pre-project coordination with resource and regulatory agencies, as appropriate.

Note 3: Potential and/or planned lagoon restoration projects may result in additional constraint considerations for nearby CRSM Plan sites (e.g., Cardiff, Fletcher Cove, San Dieguito, Torrey Pines) depending on implemented restoration design and actual site use by sensitive species such as least tern and/or snowy plover.

3.5 Anticipated Issues of Concern

3.5.1 Biological Impacts

Several types of biological impact concerns are associated with dredging and/or beach nourishment. Most impacts are associated with the construction phase of sediment management and relate to the potential to damage sensitive habitats and/or interfere with critical life functions of sensitive species from equipment, sediment removal, and/or sediment placement. Potential impact considerations during the construction phase include:

- Burial and/or removal of sensitive habitat and/or resources;
- Removal and/or damage to sensitive habitats and/or resources from equipment operation (dredges, pipelines vehicles, vessels);
- Disturbance and/or interference with movement, foraging, and/or reproduction of sensitive species from equipment operation; and
- Turbidity and/or water quality degradation associated with dredging and/or sand placement to displace and/or interfere with foraging, respiration, recruitment, and/or reproduction of water-associated animals, and/or to degrade vegetated habitats.

After sand placement, impact concerns relate to recovery rates of soft-bottom habitat functions and the potential for sand moved by waves and currents to become trapped and/or build up in sensitive habitat areas, if present nearby. Potential impact considerations after construction include:

- Compatibility of placed sands with existing sediments;
- Potential for alteration of hydrodynamics and habitat quality;
- Potential for sedimentation to degrade and/or result in loss of habitat areas of particular concern (HAPC) such as rocky reefs, canopy kelp, and seagrasses (eelgrass, surfgrass);
- Potential for sedimentation to degrade estuarine HAPC as a result of closure of lagoon inlets, and/or substantial shoaling and increases in the frequency and/or volume of maintenance dredging in lagoons and/or harbors.

Potential impacts may have adverse, beneficial, and/or no effect on habitats and/or species depending on timing of activities, magnitude of effect, and/or vulnerability or tolerance to disturbance. Consequently, locations of sensitive habitats and resources may constrain volume, schedule, and/or frequency of sediment management activities.

The CRSM Plan is geared to guide sand placement in a way that avoids and minimizes impacts to sensitive habitats and resources. Dredging and sand placement are disruptive activities with unavoidable effects to essential fish habitat. Depending on work location and/or time of year, there also may be additional constraints associated with proximity to sensitive HAPCs and breeding and/or wintering concentration areas for endangered and/or threatened species.

Appropriate protection and mitigation measures would be necessary during pre-project activities and construction to avoid and minimize effects below a level of significance.

Sediment management strategies that vary according to different volume and sand source combinations (e.g., opportunistic, maintenance dredging, and offshore sand) have different impact considerations relative to activities being conducted primarily onshore or some combination of onshore, nearshore, and offshore. These differences have the potential to affect spatial and temporal scales of impact depending on sediment characteristics, site-specific environmental conditions, and frequency of disturbance. These factors are equally important to site-specific as well as cumulative impact assessments.

3.5.2 Cumulative Impacts

Sediment management planning provides a solution to increase the regional effectiveness of beneficial reuse of maintenance dredge materials, opportunistic upland sand sources, and less frequent offshore dredging and beach nourishment projects. The potential for adverse cumulative impacts from increased beach nourishment activities in combination with stresses from multiple other projects is an important anticipated issue of concern. Because sediment management activities involve repetitive beach nourishment and dredging in certain areas, anticipated cumulative impact issues of concern include the potential for adverse effects to biological resources, degradation of essential fish habitat quality, conflicts with commercial fishing interests, and/or interference with recreational uses or surfing quality. Regional sediment management alternatives vary in strategy and target volumes for offsetting sediment deficits and addressing regional coastal erosion concerns. The CRSM Plan identifies that sediment management could be used to track sediment quantities and frequency of disturbance to inform decisions of annual target volumes at receiver sites. Adaptive refinement of such a process, if adopted, may be effective for addressing cumulative impact concerns.

3.5.3 Marine Life Protected Areas

The Marine Life Protection Act (MLPA) directs the state to design and manage a network of marine protected areas in order to, among other things, protect marine life and habitats, marine ecosystems, and marine natural heritage, as well as improve recreational, educational and study opportunities provided by marine ecosystems. Designation of marine protected areas (MPAs) is currently in the planning process throughout the State, including southern California. Once regional goals and objectives are set they will influence decisions regarding MPA size, location and boundaries, as well as management measures specific to the MPAs. The primary goal of the MPA is to protect the natural diversity and abundance of marine life, and the structure, function, and integrity of marine ecosystems. An anticipated issue of concern is the impact MPA designations may have on the region's ability to conduct sediment management activities, including beach replenishment.

3.5.4 Permit Requirements

Implementing the CRSM Plan would require permits from the agencies listed below. Local agencies may require other permits not included in this list that should be inventoried. The most expeditious manner to implement the CRSM Plan would be to secure general permits from all

agencies. Procurement of these permits would require a significant amount of time and expense. Permits required for implementation of the Plan would be as follows:

- USACE – Sections 10 and 404 permits. Issuance of these permits requires the USACE to consult with NOAA National Marine Fisheries Service and the U.S. Fish and Wildlife Service (USFWS) where necessary for Essential Fish Habitat (EFH) and ESA issues.
- California Coastal Commission – Coastal Development Permit and/or Consistency Determination.
- California State Lands Commission – Lease of State Lands for placement of sand below mean high tide line, which will include the requirement to perform a mean high tide line survey prior to the first placement as part of a long-term program.
- Regional Water Quality Control Board – Section 401 Certification for typical nourishment, and Waste Discharge Requirements (WDRs) under the State's Porter-Cologne Act and Clean Water Act if discharging fluidized dredge material (e.g., from a harbor, wetland, or lagoon).
- California State Department of Parks and Recreation – Potentially, an Encroachment Permit will be required if the receiver site is located within a State Park.
- California Department of Fish and Game – Potentially, a California Endangered Species Act (CESA) incidental take permit, 2081(b), if there is a likelihood of taking a state listed species.
- Local Agencies – A potential permit is required from the local agency of the receiver site. This may include grading permit, Coastal Development Permit (CDP), special use permit, and variances to applicable ordinances. The Cities that would issue a CDP include Oceanside, San Diego, Carlsbad, Encinitas, Del Mar, Coronado, and Imperial Beach. Solana Beach may possess the authority to issue CDPs sometime in 2009 with an approved Local Coastal Program.

Separate permits may be required for the acquisition of the source material. For example, a grading permit may be required for upland construction generating opportunistic beach fill or a USACE permit may be required for dredging or excavation within a riverbed, lagoon, or embayment. These are assumed to be the burden of the material supplier.

3.5.5 Project Objectives

The objective of the CRSM Plan is to formulate and evaluate an array of feasible sediment management alternatives for the San Diego region and identify the one that most effectively accomplishes the needs of the project.

3.6 Study Authority

This Section 905(b) analysis was prepared under the following authority:

House Committee on Transportation and Infrastructure Resolution 2672, May 22, 2002

"California Coastal Sediment Master Plan resolved by the Committee on Transportation and Infrastructure of the United States House of Representatives, That, in accordance with Section 110 of the River and Harbor Act of 1962, the Secretary of the Army is requested to develop a comprehensive plan for the management of sediment in coastal California for purposes of reducing shoreline erosion and coastal storm damages, providing for environmental restoration and protection, increasing natural sediment supply to the coast, restoring and preserving beaches, improving water quality along coastal beaches, beneficially using material dredged from ports, harbors and other opportunistic sediment sources, and related purposes."

3.7 Compliance with Applicable Regulatory Statutes and Permit Requirements

3.7.1 Federal Environmental Regulations

3.7.1.1 National Environmental Policy Act of 1969 (NEPA)

NEPA requires federal agencies to consider environmental consequences and project alternatives before a decision is made to implement a federal project. The Council on Environmental Quality (CEQ) was established under NEPA, and in 1978 issued Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (40 Code of Federal Regulations [C.F.R.] §§1500-1508). This PEIS/PEIR has been prepared in accordance with these regulations.

3.7.1.2 Coastal Zone Management Act of 1972 (CZMA) and California Coastal Act of 1976

The CZMA requires that federal activities must be consistent with the enforceable policies of the approved state coastal program to the maximum extent practicable. The California Coastal Act authorizes the California Coastal Commission (CCC) to implement the CZMA. The implementing regulations for the CZMA are described in 15 C.F.R. 930, and the policies pertinent to coastal consistency determinations are included in California Public Resources Code (Sections 30200-30365.5). These regulations require that the CCC prepare a consistency determination for all federal projects that could affect the coastal zone. A consistency determination will be required for the proposed action if it is implemented at a federal level.

3.7.1.3 Clean Water Act of 1972 (CWA)

The CWA was established to restore and maintain the chemical, physical, and biological integrity of the nation's waters. Specific sections concern different aspects of protecting waters and water quality. Section 303 requires states to establish and enforce water quality standards to protect and enhance beneficial water uses, including recreation and wildlife. Section 303 was considered in the description of the existing environment in this draft PEIS/PEIR. Section 401 applies to dredging and disposal activities, and requires certification by the Regional Water Quality Control Board (RWQCB) that the permitted project complies with State Water Quality

Standards, and would not cause concentrations of chemicals in the water column to exceed these standards. Section 404(b)(1) guidelines require that dredging and disposal activities should have

no unacceptable adverse impacts. The Corps requires a permit for the dredging and disposal of materials within the waters of the United States. A 404 permit and 401 certification may be required with some of the considered alternatives. Completion of a 404(b)(1) analysis may be required, either as part of the Corps' regulatory process or the Corps' civil works planning process.

3.7.1.4 Rivers and Harbors Act of 1899

Section 10 of the Rivers and Harbors Act prohibits the unauthorized obstruction or alteration of any navigable waters of the United States, and authorizes the Corps to regulate all activities that affect the course, capacity, or coordination of waters of the United States. The Corps processes Section 10 permits simultaneously with 404 permits because of their similar requirements.

3.7.1.5 Fish and Wildlife Coordination Act

This act requires any federal agency proposing any action that may affect wildlife to first consult with the U.S. Fish and Wildlife Service (USFWS) and/or National Marine Fisheries Service (NMFS).

3.7.1.6 Federal Endangered Species Act of 1973 (FESA)

The FESA protects endangered and threatened species by prohibiting federal actions that would jeopardize the continued existence of such species or result in the destruction or adverse modification of habitat of such species. Under Section 7(a)(2) of the FESA, federal agencies must consult with federal resource agencies (USFWS, NMFS) where a determination of may effect is made. Consultations can be formal or informal based on the project's estimated level of impacts to listed species and the level of agreement between agencies on the impact assessment and measures required to avoid or minimize those impacts.

Most consultations are conducted informally. Informal consultations: clarify whether and what listed, proposed, and candidate species or designated or proposed critical habitats may be in the action area; determine what effect the action may have on these species or critical habitats; explore ways to modify the action to reduce or remove adverse effects to the species or critical habitats; determine the need to enter into formal consultation for listed species or designated critical habitats, or conference for proposed species or proposed critical habitats; and explore the design or modification of an action to benefit the species.

Formal consultation becomes necessary when: (1) the Corps requests consultation after determining the proposed action may adversely affect listed species or critical habitat, however, if the Service concurs that the proposed action is not likely to adversely affect any listed species or critical habitat (i.e., the effects are completely beneficial, insignificant, or discountable), then formal consultation is not required; or (2) the Services, through informal consultation, do not concur with the Corps's finding that the proposed action is not likely to adversely affect the listed species or critical habitat. Formal consultation requires a Biological Assessment (BA) be prepared, which provides a site assessment and field surveys for the listed species to be potentially impacted by the project. The USFWS and/or NMFS then will prepare a Biological Opinion (BO) on how the action would affect the species and/or its critical habitat, and will

suggest reasonable and prudent measures that it believes would avoid jeopardizing the continued existence of the species or adversely modifying its critical habitat.

3.7.1.7 Magnunson-Stevens Fishery Management and Conservation Act, as amended 1996 (Public Law 104-267)

Federal agencies must consult with the NMFS on actions that may adversely affect Essential Fish Habitat (EFH). EFH is defined as those "waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The NMFS encourages streamlining the consultation process using review procedures under NEPA, Fish and Wildlife Coordination Act, Clean Water Act, and/or FESA provided that documents meet requirements for EFH assessments under Section 600.920(g). EFH assessments must include (1) a description of the proposed action, (2) an analysis of effects, including cumulative effects, (3) the federal agency's views regarding the effects of the action on EFH, and (4) proposed mitigation, if applicable. Descriptions and evaluations of EFH for the coastal zone effected by the CRSM Plan are included in this PEIS/PEIR.

3.7.1.8 Marine Mammal Protection Act

This act protects marine mammals and establishes a marine mammal commission to regulate such protection. This act was considered in the evaluation of environmental consequences of the alternatives.

3.7.1.9 Migratory Bird Treaty Act of 1972

This Act (16 U.S.C. § 703, amended 1994) between the United States and Canada, and subsequent amendment to the Act, provide legal protection for most breeding birds occurring in the United States. The Act restricts the killing, taking, collecting, selling or purchasing of native bird species or their parts, nests, or eggs. Similarly, the Convention for the Protection of Migratory Birds and Animals (1936) between the United States and Mexico offers similar protection to birds. These regulations were considered in the evaluation of consequences of the alternatives.

3.7.1.10 Executive Order 11990

This Order requires that governmental agencies, in carrying out their responsibilities, provide leadership and "take action to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands." This Order was considered in the development of alternatives.

3.7.1.11 National Historic Preservation Act (NHPA)

Section 106 of the NHPA (16 U.S.C. § 479) of 1966, as amended, established the National Register of Historic Places (NRHP), which is a master list of historic properties of national, state, and local significance. Under Section 106, agencies are required to consider the effects of their actions on properties that may be eligible for or are listed in the NRHP. The NRHP established the Advisory Council on Historic Preservation (ACHP) to comment on federally licensed, funded, or executed undertakings affecting National Register properties. Regulations of the

ACHP (36 C.F.R. § 800, 1997) provide guidance for federal agencies to meet Section 106 requirements. This process involves consultation with the State Historic Preservation Officer (SHPO), the ACHP, and other interested parties, including Native American Tribes, as warranted. The Corps consulted with SHPO regarding this project.

3.7.1.12 Clean Air Act of 1972 (CAA)

The CAA regulates emissions of air pollutants to protect the nation's air quality. Section 118 of the CAA (42 U.S.C. § 7418) requires all federal agencies engaged in activities that may result in the discharge of air pollutants to comply with federal, state, interstate, and local requirements regarding control and abatement of air pollution. Section 176(c) requires all federal projects to conform to EPA-approved or promulgated State Implementation Plans. This Act was considered in the evaluation of consequences of the alternatives.

3.7.1.13 Executive Order 12088

This Order requires federal compliance with applicable pollution control standards concerning air and water pollution, and hazardous materials and substances. Federal agencies are directed to consult with state and local agencies concerning the best techniques and methods available for the prevention, control, and abatement of environmental pollution. This Order was considered in the evaluation of alternatives.

3.7.1.14 Executive Order 12989

This Order addresses "Environmental Justice in Minority Populations and Low-Income Populations." The Order is designed to focus federal attention on actions that affect environmental and human health conditions in minority and low-income communities. This Order was considered in the evaluation of consequences of the alternatives.

3.7.1.15 Executive Order 13045

This Order addresses "Environmental Health and Safety Risks to Children." This Order is designed to focus federal attention on actions that affect human health and safety conditions that may disproportionately affect children. This Order was considered in the evaluation of consequences of the alternatives.

3.7.2 State Environmental Regulations

3.7.2.1 California Environmental Quality Act (CEQA)

This act requires that state and local agencies consider environmental consequences and project alternatives before a decision is made to implement a project requiring state or local government approval, financing, or participation by the State of California. In addition, CEQA requires the identification of ways to avoid or reduce environmental degradation or prevent environmental damage by requiring implementation of feasible alternatives or mitigation measures. This PEIS/PEIR has been prepared in accordance with CEQA.

3.7.2.2 Porter-Colonge Water Quality Control Act of 1969

This act (California Water Code §§ 13000-13999.10) mandates that activities that may affect waters of the state shall be regulated to attain the highest quality. The state RWQCB provides regulations for a "non-degradation policy" that are especially protective of waters with a high quality in regard to beneficial uses. This act was considered in the evaluation of consequences of the alternatives.

3.7.2.3 California Endangered Species Act (CESA)

The California Department of Fish and Game (Code §§ 2050-2116) has regulatory authority over state-listed endangered and threatened species. The California State Legislature encourages cooperative and simultaneous findings between state and federal agencies. If CDFG participation in federal consultation and adoption of a federal BO is found to be inconsistent with CESA, the CDFG will issue its own BO per Section 2090 of the state code and may issues a Section 2081 take permit with conditions of approval. A BO may be required with some of the considered alternatives.

4.0 Alternatives

The CRSM Plan identifies both action and no-action alternatives. These alternatives differ relative to the inclusion of sand management devices, beach placement type and by sand sources proposed and are discussed in detail within this section.

4.1 No Action

The No Action Alternative would retain the existing sediment management practices in place with no further federal action to develop a regional beach nourishment permit. Continued beach nourishment projects would likely continue to take place on an ad hoc basis.

4.2 Beach Placement Types

There are up to three possible beach fill design options in the CRSM Plan: (1) placement as a beach berm; (2) placement directly into the surf zone; or (3) nearshore placement. The three CRSM Plan design options are described in this section. Cross-section schematics of these placement methods are shown in Figure 3. Onshore receiver sites would receive sand via dredge or truck deposition and would utilize the beach berm or surfzone placement methods while nearshore receiver sites would receive sand only via dredge or pipeline through a dredge operation and would utilize the nearshore placement method. Different placement methods provide greater flexibility to use the broader range of sediment characteristics associated with different sources of material. With each method, sediment sources must be free of contamination and meet sediment compatibility criteria appropriate to the receiving environment. The CRSM Plan assumes source sediments to be consistent with guidelines established with the SCOUP program and the Department of Army Regional General Permit 67.

4.2.1 Beach Berm

Beach fill may be placed as a layer over the existing beach as a berm. The berm would be a level surface extending a certain distance from the back of the beach towards the ocean, then sloping gradually into the water. The elevation, width, length, and slope of the berm would vary for each sand placement opportunity, depending upon the quantity of material to be placed and its qualities, as well as the condition of the beach at the time of material placement. However, elevations would generally extend from the back of the beach at approximately +12 feet relative to Mean Lower Low Water (MLLW) to -2 feet MLLW. The beach berm option would only be used when there is beach quality sand that would visually blend in with the natural beach sand and would not form a hardpan. Once the fill material is placed on or near the receiver site, it would be redistributed by wave action and other natural forces. The initial placement size would be naturally redistributed to reach an equilibrium profile that would vary from construction.

Figure 3. Cross Sectional Views of CRSM Plan Placement Options

4.2.2 Surf Zone Placement

Beach fill may also be placed below the mean high tide line (MHTL) directly into the surf zone if the material is darker colored than the existing beach sand or has a relatively higher fines content of silt/clay (fines) while still meeting sediment compatibility criteria. This placement option could be utilized for receiver sites without rocky substrate with sensitive resources (e.g., surfgrass) in the surf zone. The darker-colored clays would be winnowed out of the material by waves and currents and carried offshore with sand being left behind. Dimensions may vary depending on conditions at the time of construction, including time of year, quantity, and specific beach fill design. However, the elevation of surfzone placement would generally extend from approximately +2 feet MLLW to -2 feet MLLW. Generally, greater turbidity is generated with this type of placement; therefore, daily placement volume is limited to what can be reworked on a tidal cycle. This placement method could be utilized at receiver sites without nearby sensitive resources (e.g., vegetated reefs, least tern nesting sites during the breeding season) and generally is more suitable outside the peak summer use period.

4.2.3 Nearshore Placement

Sand may also be placed nearshore at appropriate beach locations. This placement option could be utilized for receiver sites without sensitive nearshore resources (e.g., Pismo clam beds, giant kelp beds, surfgrass beds, persistent reefs). Because sediment grain size characteristics range finer in the nearshore, material that is less-than-optimum for placement on the dry beach may be placed nearshore if it is compatible with the nearshore portion of the beach profile. The SCOUP program defines compatibility as sediment characteristics being within 10% of the receiver site; therefore if a nearshore site ranges from 5 to 35% fines, less-than-optimum beach fill material may be defined as ranging from 15 to 45% fines. Dimensions may vary with this design option depending on conditions at the time of construction, including time of year, quantity, and design. Nearshore placement may involve discharge from a pipeline and/or release from a hopper dredge or dredge barge depending on receiver site and source of material. Material would be placed in water depths between -10 and -25 feet MLLW. Pipeline discharge would deposit a layer of sediment over a certain swath of the nearshore with the pipeline moved to spread material without excessive mounding. It may initially be placed in water depths between -10 and -25 feet MLLW and reach a crest elevation of near -10 feet MLLW depending on quantities.

4.3 CRSM Plan Sand Management Device Concepts

The CRSM Plan proposes the installation of beach sand retention concepts referred to as sediment management devices, as a component of two of the alternatives. Installation of these hard structures would act to retain sand within the region and reduce the volume of sand proposed for placement in these alternatives. Similar to the project scenarios without sand retention, the two different types of sediment sources are considered, including upland and offshore sands. Alternatives that consider sediment management devices assume sand is brought in from outside the littoral zone, as new sources, to pre-fill new sand deposits that will form and to prevent any net loss of sediment downcoast. New sand from outside the littoral zone is required to pre-fill the new sand deposits because sand retention could potentially “rob” downcoast beaches of sand. Therefore, sediment sources described herein include new upland

and offshore sources that would be dedicated as pre-fill for a sediment management device project, and placed as part of that project. Sand in harbors and lagoons are considered temporarily trapped littoral sand that can be recycled back into the littoral zone during maintenance activities, but are not considered new sand. Lagoon restoration could serve as new sands, but the timing of restoration may not necessarily coincide with installation of sediment management devices so these sources are assumed to be separate from projects with sediment management devices.

Structural sediment management devices consist of reefs that are both submerged and emergent from the water surface, natural headlands, artificial groins, breakwaters, harbor jetties, permeable pile piers, and possibly other features yet to be identified. The CRSM Plan generically proposes undefined sediment management devices to reduce placement volumes by 50%, which would reduce volumes to 500,000 cubic yards per year of sand on beaches within the region over approximately half a century. Sediment management devices and locations are not specified herein but will be evaluated in subsequent environmental review.

4.4 Action Alternatives

Action alternatives focus on the goal of meeting the overall beach nourishment quantity target for the region, while avoiding adverse impacts by adjusting timing, quantities, and possibly locations of nourishment. The CRSM Plan identifies four action alternatives that would accomplish nourishment of the region at the target rate, as described within this section.

4.4.1 One Million Cubic Yards Per Year Without Sediment Management Devices From Upland and Offshore Sources

Under this scenario a minimum of 1,000,000 cy/yr of sand would be proposed for beach nourishment of the San Diego region over a period of approximately fifty years. An increased nourishment quantity is proposed compared to other alternatives since no sediment management devices are included within this alternative. Sediment sources would be both from offshore and upland.

4.4.2 One Million Cubic Yards per Year Without Sediment Management Devices From Offshore Sources

Under this scenario, all sand is dredged from offshore and delivered to the coast at a rate of approximately 1,000,000 cy/yr over fifty years with no sediment management devices in place. This scenario assumes that beach nourishment from opportunistic beach fill programs are not productive and result in no sediment contribution to the coast. Beach nourishment associated with offshore dredging would be done annually, or on a less frequent basis (such as 5,000,000 cubic yards every five years) to keep mobilization costs down. Sand sources would be all possible offshore sites identified by SANDAG and others.

4.4.3 One-Half Million Cubic Yards per Year from Upland Sand Sources with Sediment Management Devices

This alternative proposes to place 500,000 cy/yr over fifty years solely from upland sand sources. This alternative also proposes sediment management devices to be constructed along the coast in order to reduce the amount of sand being lost. The majority of sand sources would be derived from active SCOUP programs within the Cities of Oceanside, Carlsbad, Encinitas, Solana Beach, Coronado and Imperial Beach. These cities have permits for five years all starting in 2009, except the City of Carlsbad, which started in 2006. Assuming all of these programs operate at their maximum capacity, a total of 895,000 cy/yr of sediment would be input to the region's coast. Further, if all materials consist of up to 25 percent fine-grained particles, the net quantity of sand that would be placed could range from 671,000 cy/yr (assuming all material consists of 25 percent of fines) to 895,000 cy/yr (assuming 0 percent fines content). Therefore, opportunistic beach fill programs could entirely nourish the region's coast in the presence of sediment management devices under all of these assumptions, if enough sources become available.

4.4.4 One-Half Million Cubic Yards Per Year from Offshore Sand Sources with Sediment Management Devices

This alternative proposes to place 500,000 cy/yr over fifty years solely from offshore sand sources. This alternative also proposes sediment management devices to be constructed along the coast in order to reduce the amount of sand being lost. Beach nourishment from offshore sources could be done annually, or on a less frequent basis (such as 2,500,000 cubic yards every five years). Sand sources would be from all possible offshore sites identified by SANDAG and others.

5.0 Proposed CRSM Plan Beach Receiver Sites

Detailed descriptions for 12 of the 27 CRSM Plan receiver sites are given in this section. These sites are ones either already permitted for opportunistic beach fill programs (OBFPs), in the permitting process for future OBFPs, or are otherwise highly likely to move forward.

Habitat maps identifying habitat types, including habitat areas of particular concern, are provided in Appendix A. Areas to be avoided and environmental windows (if any) are included in the following descriptions of receiver sites. Construction work windows may be constrained depending on occurrence or proximity to sensitive species or their habitats. Construction during spring-summer may be constrained at onshore receiver sites by spawning runs of California grunion, proximity to snowy plover nesting sites and/or critical habitat, or proximity to California least tern nesting sites. Construction schedules at nearshore receiver sites also may be constrained during spring-summer because least terns may forage up to several miles from their nesting sites. Construction work windows during fall-winter may be constrained at onshore receiver sites if wintering concentrations of snowy plover are present. Biological constraints relevant to construction windows and site use are identified for each receiver site in the following subsections.

5.1 City of Imperial Beach

The City of Imperial Beach is located approximately 12.5 miles south of downtown San Diego along the Pacific Coast. Three CRSM Plan receiver sites are proposed within the City of Imperial Beach. Two of these three sites have previously been utilized or are currently proposed for beach nourishment, as discussed below.

5.1.1 South Imperial Beach Onshore Placement Site

The proposed Imperial Beach onshore site has been used previously as part of SANDAG's Regional Beach Sand Project (RBSP) I and is currently proposed for opportunistic beach fill under the City's SCOUP program. As part of the RBSP project, 120,000 cy were placed at this location in Spring 2001. As shown in Figure 4, the CRSM Plan site footprint would be located between Imperial Beach Boulevard and the southern end of Seacoast Drive. The Imperial Beach Municipal Pier is located immediately north of the site. Oceanfront homes line the back of the beach in this area and portable lifeguard towers are the only structures located on the beach.

Placement at this location would be via dredge if source material is derived from marine sources or via truck if the source material is from upland. Sand would be placed in either a beach berm or in a low-tide mound or linear dike in the surfzone contingent on the quality of the material and method of delivery.

Sand placement at this site would be consistent with restrictions established within the City's SCOUP program. The program allows placing up to a maximum of 75,000 cy/yr of sand at this site and allows material with fines content of up to 25 percent during the offseason. Each individual project would be limited to a maximum volume of 25,000 cy. Offseason placement is acceptable for material containing 11-25% fines, but this fines fraction is not acceptable during the summer season from March 1st to September 14th due to bird foraging. The fines fraction

acceptable during the breeding season is 10% or less. However, placement during this season would still require coordination with USFWS. More detail regarding the seasonal restrictions of sand placement at this site is shown in Table 8.

Construction during spring-summer is constrained and the USACE and resource agencies would coordinate prior to construction. Least tern nesting sites are located less than 3,000 feet from the receiver site. Snowy plover critical habitat and potential wintering areas are adjacent to the downcoast boundary of the site; known nesting areas are located more than 2,300 feet downcoast. Constraints due to grunion runs would depend on beach condition and suitability for spawning, which would be checked during a pre-project assessment. This also may be relevant to Pismo clams, although they were detected during recent reconnaissance beach surveys, no substantial beds were noted (SAIC 2009).

The proposed haul route for trucks from upland sources (i.e. construction sites) to the site would include Coronado Boulevard, Imperial Beach Boulevard, and Seacoast Drive. As shown in Figure 5, beach access points include Elm Avenue, Descanso Avenue, and the southernmost end of Seacoast Drive. Admiralty Avenue is also included as an option to access the beach as an entry and exit point; however, it would require constructing a temporary berm to allow trucks to get to and from the beach. This option, although not ideal, is still a possible access point. These entry and exit points allow trucks to access the beach and deposit their load for disbursement by earthmoving equipment. The location of these access points also allow for flexibility in truck movement to gain access from the north and exit the beach to the south or vice versa. In addition, for construction sites within a block from the beach or other developments on the beach north of the pier, trucks hauling opportunistic sand material could be driven south on the beach to Imperial Beach Boulevard at off-peak use hours and during the off-peak season. However, it should be noted that this would only be allowed for projects located along the beachfront and within a block from the beach. The beach itself is not designated as a proposed haul route.

Staging is available in the City of Imperial Beach in the Port of San Diego parking lots near Dahlia Avenue and Elkwood Avenue, which are subject to the Port of San Diego's approval. Equipment in these parking lots identified for staging areas are also subject to Port of San Diego's approval. Trucks would be in queue along Imperial Beach Boulevard north of the Tijuana Estuary. Based upon the maximum total of 75,000 cy per year, it is estimated that an approximate total of 32 truck trips would be required per working day for a project duration of 15 weeks and assuming five working days out of each week for approximately eight hours each day. However, per the City's SCOUP program, the maximum sand quantity for an individual project would be 25,000 cy that would be placed in five weeks (Table 8). As previously mentioned, during any placement of beach sand, proposed haul routes must be coordinated with other projects in Imperial Beach that may impact identified haul routes.

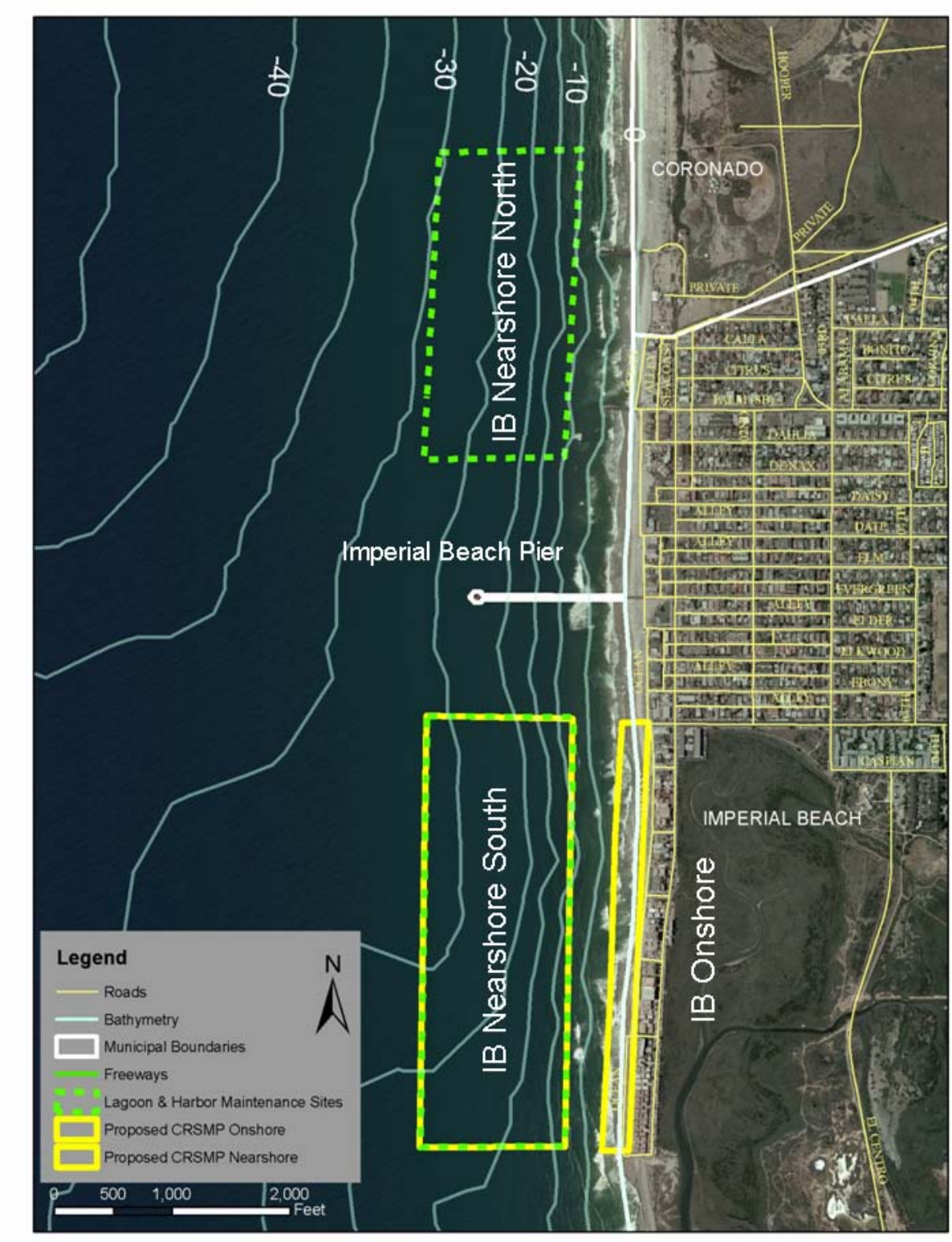

Figure 4. City of Imperial Beach CRSM Plan Placement Sites

Source: EDAW 2008

Figure 5. City of Imperial Beach Haul Route and Staging

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Table 8. Seasonal Restrictions of SCOUP Programs

Receiver Site (north to south)	Beach Fill Design	Amount of Sand (cy) Per Year & Truck Trips	Percent Fines	Season and Duration	Staging Area / Haul Route(s)	Ingress / Egress	Source / Stockpile Location
City of Encinitas							
Moonlight Beach – South of A Street to North of D Street, approx. 1,100 feet (Same footprint as RBSP)	Beach Berm: create an approximate 180-foot berm with a 20:1 slope approximately 50 to 500 feet offshore with a finished surface elevation of +12 feet MLLW Below MHTL: 3- to 4-foot-high mound placed near the +1 foot MLLW approximately 300 to 350 feet offshore	Amount of Sand: up to 150,000 if 0 – 10% fines; up to 25,000 if 11 – 25% fines (Received 154,000 in RBSP at 4% fines) # of Truck Trips: 10,714 for 150,000 cu. yd.	25% fines or less	September 15 – February 28: unrestricted if <10% fines, up to 25,000 cy if 11% – 25% fines. March 1 – May 31* June 1 – September 14: no placement to avoid high beach use season Placement Monday – Friday during typical construction hours (7:00 a.m. to dusk), no holidays or weekends.	Staging Area: In Moonlight Beach parking lot and near restrooms; Park-n-Ride lot (Caltrans was supportive but would require an encroachment permit – City would submit permit application as projects come up) but would only be available from 9:00 a.m. to 3:30 p.m. Monday - Friday Haul Route(s): I-5, Coast Highway 101, Encinitas Boulevard	Ingress: Moonlight Beach public access from western terminus of Encinitas Boulevard (B Street) Egress: Either loop back and exit via Encinitas Boulevard.	Source: Local contribution; possibly including material in Saxony detention basin Stockpile: City's Public Works facility on Calle Magdalena is a potential site
Batiquitos – South of Batiquitos Lagoon inlet, approx. 750 feet long (Same footprint as RBSP)	Beach Berm: create an approximate 350-foot berm with a 10:1 slope approximately 350 feet offshore with a finished surface elevation of +12 feet MLLW Below MHTL: 3- to 4-foot-high mound placed near the +1 foot MLLW approximately 450 to 525 feet offshore	Amount of Sand: up to 120,000 if 0 – 10% fines; up to 25,000 if 11 – 25% fines (Received 117,000 in RBSP at 4% fines) # of Truck Trips: 8,571 for 120,000 cu. yd.	25% fines or less	September 15 – February 28: unrestricted if <10% fines, up to 25,000 cy if 11% – 25% fines. March 1 – May 31* June 1 – September 14: no placement to avoid high beach use season Placement Monday – Friday during typical construction hours (7:00 a.m. to dusk), no holidays or weekends.	Staging Area: None available at the Batiquitos site; Park-n-Ride lot (Caltrans was supportive but would require an encroachment permit – City would submit permit application as projects come up) but would only be available from 9:00 a.m. to 3:30 p.m. Monday - Friday Haul Route(s): I-5, La Coasta Avenue, Poinsettia Avenue, Carlsbad Boulevard	Ingress: South of Batiquitos inlet from Carlsbad Boulevard Egress: Either loop back and exit to Carlsbad Boulevard.	Source: Local contribution; possibly including material in Saxony detention basin Stockpile: City's Public Works facility on Calle Magdalena is a potential site
City of Solana Beach							
From Fletcher Cove south within RBSP footprint (RBSP footprint was from Fletcher Cove south approximately 1,900 feet)	Beach Berm: create an approximate 100-foot berm with a 10:1 slope approximately 50 to 250 feet offshore with a finished surface elevation of +9 feet MLLW Below MHTL: 3- to 4-foot-high mound placed near the +2 foot MLLW approximately 200 to 275 feet offshore	Amount of Sand: up to 150,000 if 0 – 10% fines; up to 25,000 if 11 – 25% fines (Received 146,000 in RBSP at 4% fines) # of Truck Trips: 10,714 for 150,000 cu. yd.	Up to 25% maximum for small projects; 10% or less for large projects within same footprint as RBSP with monitoring; additional monitoring with 11% to 25% fines	September 15 – February 28: unrestricted if <10% fines, up to 25,000 cy if 11% – 25% fines. March 1 – May 31* June 1 – September 14: no placement to avoid high beach use season unless only pure sand Placement Monday – Friday; 9am – 2pm; Potential night time construction 7pm – 5am, no holidays or weekends.	Staging Area: Parking lot at Fletcher Cove and Distillery parking lot across from Fletcher Cove along Sierra Avenue Haul Route(s): Lomas Santa Fe Drive, Coast Highway 101, and possibly Via de la Valle per discussions with the City of Del Mar and the City of San Diego	Ingress: Concrete ramp at Fletcher Cove Egress: Concrete ramp at Fletcher Cove	Source: Local contribution Stockpile: None.
City of Coronado							
Between NAS North Island and Naval Amphibious Base; North Beach portion from NAS North Island south approximately 1,000 feet south available in high beach season (No RBSP site in Coronado)	Beach Berm: create an approximate 200-foot berm with a 20:1 slope approximately 500 to 900 feet offshore with a finished surface elevation of +10 feet MLLW Below MHTL: 2- to 3-foot-high mound placed near the +2 foot MLLW approximately 850 to 875 feet offshore	Amount of Sand: 100,000 maximum; only 50,000 cy/yr at North Beach (No RBSP site in Coronado.) # of Truck Trips: 7,143 for 100,000 cu. yd.	Less than 5%; onsite screening and sanitize sand for North Beach; the Shores could receive up to 10% fines.	September 15 – February 28: unrestricted if <10% fines, 0 cy if 11% – 25% fines (City's choice). March 1 – May 31* June 1 – September 14: no placement except for backshore at North Beach . Placement Monday – Friday during typical construction hours (7:00 a.m. to dusk), no holidays or weekends.	Staging Area: None available Haul Route(s): Ocean Drive, Ocean Boulevard, Orange Avenue, Avenida del Sol, Avenida del Lunar.	Ingress / Egress: Ocean Drive, Avenida del Sol, and Avenida del Lunar; Ocean Place and Ocean Boulevard (bridge to Orange Avenue), or Third Street to Alameda Boulevard to Ocean Boulevard	Source: Local contribution – within the city boundaries; Navy (best source) Stockpile: None.
City of Imperial Beach							
Imperial Beach Boulevard to the southern end of Seacoast Drive; south of Admiralty Way allowed all year (RBSP site from Admiralty Way south approx. 2,300 feet)	Beach Berm: create an approximate 120-foot berm with a 20:1 slope approximately 50 to 375 feet offshore with a finished surface elevation of +10 feet MLLW Below MHTL: 2- to 3-foot-high mound placed near the +2 foot MLLW approximately 250 to 300 feet offshore Near-shore: -5 to -25 MLLW and approximately 252 feet to 2,000 feet offshore	Amount of Sand: 75,000 maximum per year, with 25,000 maximum per project (Received 120,000 in RBSP at 2% fines) # of Truck Trips: 5,357 for 75,000 cu. yd.	25% fines or less	September 15 – February 28: unrestricted if <10% fines, up to 25,000 cy if 11% – 25% fines. March 1 – May 31* June 1 – September 14*: placement would require coordination between USACE and USFWS and may require least tern and snowy plover monitoring, and may require grunion monitoring if habitat suitable for spawning, Placement Monday – Friday during typical construction hours (7:00 a.m. to dusk), no holidays or weekends.	Staging Area(s): Trucks along Imperial Beach Boulevard north of Slough. Use 9th Street from north into the city. Equipment in Port of San Diego parking lots near Dahlia Avenue and Elkwood Avenue. Haul Route(s): Coronado Boulevard/ Imperial Beach Boulevard, 9th Street, Seacoast Drive along its entire length if needed; southern street ends.	Ingress: Admiralty Avenue, Descanso Avenue, Elm Avenue, and the south end of Seacoast Drive Egress: Descanso Avenue, southern end of Seacoast Drive (ingress/egress could reverse during low tide), and Descanso Avenue and Elm Avenue	Source: Local contribution Stockpile: None.

*Grunion monitoring may be required if habitat suitable for spawning; would allow up to 25,000 cy per month (maximum placement of 14 days/month) with a maximum fines percentage of 10% and a minimum distance of 150 feet between placements at sandy beaches only.

Source: EDAW 2008

5.1.2 North Nearshore Placement Site (North of Pier)

As shown in Figure 4, the North Imperial Beach Nearshore site is located approximately 500 feet north of the Imperial Beach Municipal Pier. The proposed site is approximately 2,600 feet in length and 700 feet in width. The site would extend from approximately Donax Avenue to the south to 850 feet north of the northernmost jetty to the north. Sediment would be placed via hydraulic dredge pipeline or by barge approximately 600 feet offshore in water depths from -10 feet to -25 feet MLLW.

Construction during spring-summer may be constrained and the USACE and resource agencies would coordinate prior to construction. During predicted grunion runs, construction may be constrained over each 4-day run for a period of approximately 4 hours each night, but only during actual spawning runs. This constraint would not apply if the adjacent beach conditions were unsuitable for spawning. Least tern nesting sites are located more than one mile from the receiver site. No sensitive hard bottom habitats occur within the site boundaries and no Pismo clam beds were detected during recent surveys (SAIC 2009). Because Pismo clams were detected at the south onshore beach site there is the potential for nearshore occurrence; therefore, future sand placement activities should include pre-project assessments to ensure activities avoid clam beds, if present.

5.1.3 South Nearshore Placement Site (South of Pier)

As shown in Figure 4, the South Imperial Beach Nearshore site is located approximately 1,000 feet south of the Imperial Beach Municipal Pier. A portion of this site was previously utilized by the USACE during San Diego Bay dredging activities and is currently proposed as a SCOUP program site. The proposed site is approximately 3,600 feet in length and 1,250 feet in width. The site would extend from approximately Imperial Beach Boulevard to the north to the southern terminus of Seacoast Drive to the south. Sediment would be placed via hydraulic dredge pipeline or by barge approximately 600 feet offshore in water depths from -10 feet to -30 feet MLLW. Sand placement at this site would be consistent with restrictions established within the City's SCOUP program (Table 8).

Construction during spring-summer may be constrained and the USACE and resource agencies would coordinate prior to construction. Least tern nesting sites are less than 3,000 feet from the receiver site. During predicted grunion runs, construction may be constrained during the 4-day run for a period of approximately 4 hours on each night, but only during actual spawning runs. That constraint would not apply if the adjacent beach conditions were unsuitable for spawning. Localized low-relief rock and cobble occur near the seaward limit of the site boundary in the southern half of the site, but should not constrain site use. These hard bottom areas are subject to sand scour and primarily support non-sensitive turf algae with limited and sparse occurrence of giant kelp (SAIC 2009). Because Pismo clams were detected at the south onshore beach site there is the potential for nearshore occurrence; therefore, future sand placement activities should include pre-project assessments to ensure activities avoid clam beds, if present.

5.2 City of Coronado

The City of Coronado is located approximately five miles south of downtown San Diego along the Pacific Coast. Two CRSM Plan sites are proposed within the City of Coronado. Portions of both of these sites are currently proposed for beach nourishment, as discussed within this section.

5.2.1 Onshore Placement Site

The Coronado Beach onshore site is currently proposed for opportunistic beach fill under the City's SCOUP program. Figure 6 illustrates the CRSM Plan Coronado Beach Onshore footprint, which extends 8,000 feet from South O Street to Avenida Lunar. Access to the site would be via Ocean Drive, Avenida del Sol, Avenida Lunar, Ocean Place and Ocean Boulevard (bridge to Orange Avenue), and Third Street to Alamenda Boulevard to Ocean Boulevard. The Coronado Onshore receiver site is located adjacent to Ocean Boulevard, whose western edge is lined with a rock revetment and there are residences located across the street from the beach. The Hotel del Coronado and oceanfront apartments/condominiums line the back of the beach in the southern portion of the receiver site. The beach facilities and lifeguard towers are the only current structures located on the beach.

Placement at this location would be via dredge if source material is derived from marine sources or via truck if the source material is from an upland source. Sand would be placed in either a beach berm or in a low-tide linear mound in the surfzone contingent upon the quality of the material.

Sand placement at this site would be consistent with restrictions established within the City's SCOUP program, which is currently pending resource agency approval. The program allows placing up to a maximum of 100,000 cy/yr of sand within the City and allows a fines content of 10 percent or less, with 5% fines for North Beach and up to 10% fines for Coronado Shores. However, the largest project expected to occur would be 50,000 cy. The beach area in front of the high rise residential complex, known as the Coronado Shores, could receive up to 10 percent fines. More detail regarding the seasonal restrictions of sand placement at this site is shown in Table 8.

Construction is constrained and the USACE and resource agencies would coordinate prior to construction. Snowy plover nesting areas are less than 1,500 feet from the receiver site, critical habitat occurs within the receiver site boundaries, and the site is a potential wintering area for snowy plover. Least tern nesting sites are more than one mile from the receiver site. Constraints due to grunion runs would depend on beach condition and suitability for spawning, which would be checked during a pre-project habitat assessment. This also may be relevant to Pismo clams, although detected during recent reconnaissance beach surveys; the occurrence or extent of Pismo clam beds was not determined (SAIC 2009).

The proposed haul route for trucks from upland sources to the receiving beach would include 4th Street, Ocean Drive, Ocean Boulevard, Orange Avenue, Avenida del Sol and Avenida Lunar. Beach access points include Ocean Drive, Avenida del Sol, Avenida Lunar, Ocean Place and Ocean Boulevard (bridge to Orange Avenue), and Third Street to Alameda Boulevard to Ocean Boulevard (Figure 7). These entry points allow trucks to access the beach and deposit their load for disbursement by earthmoving equipment. Trucks would loop back and exit at the point of beach entry. No staging area is identified for this receiver site. Based upon the maximum total of

100,000 cy per year, it is estimated that an approximate total of 42 truck trips would be required per working day for a project duration of 20 weeks, assuming five working days per week for approximately eight hours each day. The most typical quantity would be placed in 10 weeks. Sand placement may occur outside the high beach use season only at North Beach. Proposed placement activities vary seasonally to minimize impacts to biological resources including snowy plover.

5.2.2 Nearshore Placement Site

The Coronado CRSM Plan nearshore site is located along North and South Reaches of Coronado Shores. The site is currently proposed as a SCOUP program site and is approximately 8,000 feet in length and 1,200 feet in width (Figure 6). The site is proposed to extend from South O Street to Avenida Lunar. Sediment would be placed via hydraulic dredge from a floating platform with stabilized pipe outlet or a barge approximately 450 feet offshore in water depths from -10 feet to -30 feet MLLW.

Sand placement at this site would be consistent with restrictions established within the City's SCOUP program. More detail regarding the seasonal restrictions of sand placement at this site is shown in Table 8.

Construction work windows may be constrained and the USACE and resource agencies would coordinate prior to construction. During predicted grunion runs, construction may be constrained over each 4-day run for a period of approximately 4 hours each night, but only during actual spawning runs. That constraint would not apply if the adjacent beach conditions were unsuitable for spawning. Least tern nesting sites are located more than one mile from the receiver site. Because Pismo clams were detected at the onshore beach site there is the potential for nearshore occurrence, although no substantial beds were observed during a recent survey (SAIC 2009). Future sand placement activities should include pre-project assessments to ensure activities avoid clam beds, if present.

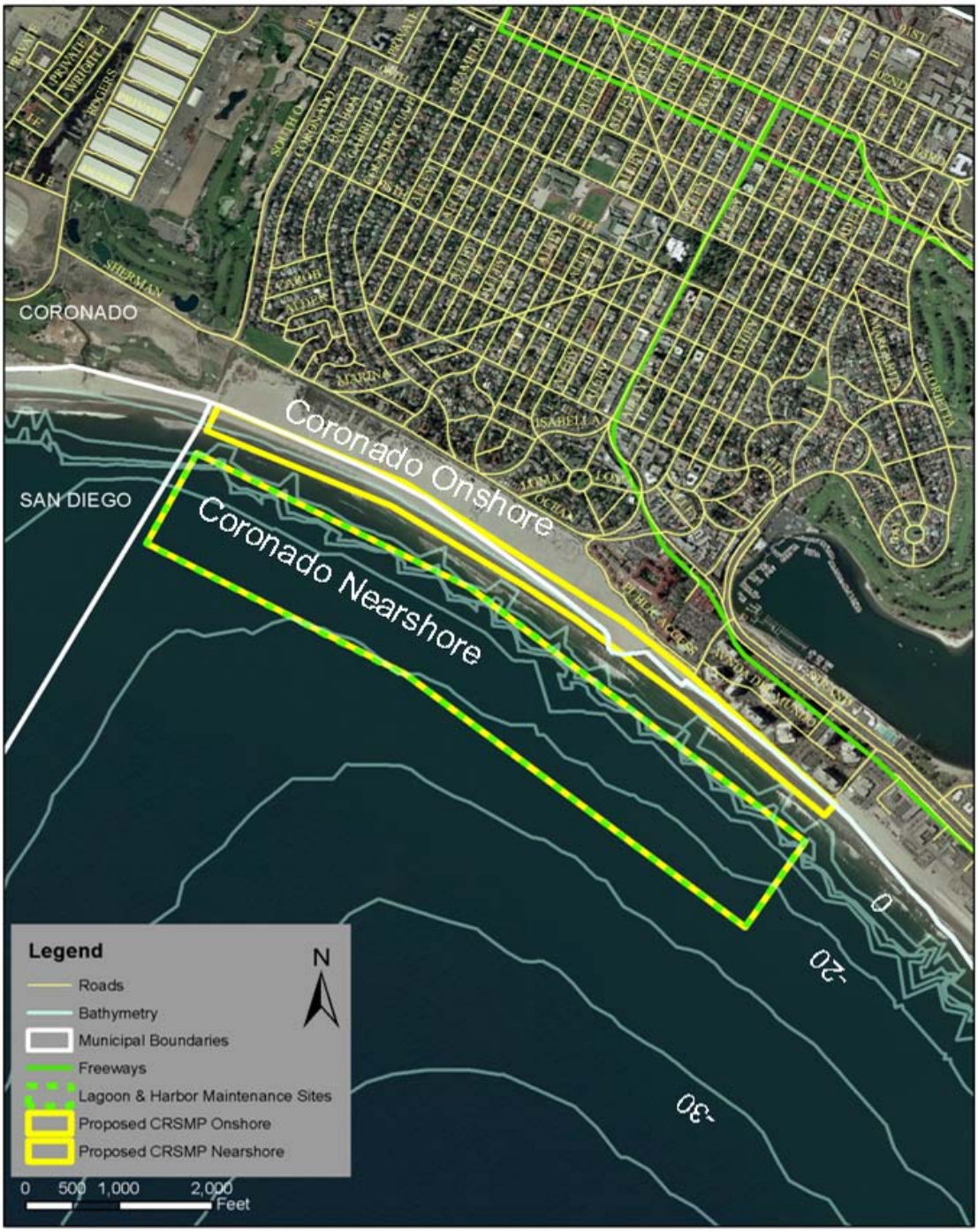


Figure 6. City of Coronado CRSM Plan Placement Sites

Source: EDAW 2008

Figure 7. City of Coronado Haul Route and Staging

5.3 City of Solana Beach

The City of Solana Beach is located approximately 23 miles north of downtown San Diego along the Pacific Coast. One CRSM Plan site is proposed within the City of Solana Beach. This placement site has previously been utilized and is currently proposed for beach nourishment, as discussed within this section.

5.3.1 Onshore Placement Site

The Solana Beach onshore site has been used previously as part of SANDAG's RBSP I project and is currently proposed for opportunistic beach fill under the City's SCOUP program. As part of the RBSP project, a portion of this site received 140,000 cy of sand in Spring 2001. Figure 8 illustrates the CRSM Plan Solana Beach Onshore footprint, which extends 2,600 feet between approximately Fletcher Cove Park to the north and the Seascape Surf beach access stairway to the south. The site is located at the toe of a high relief bluff, which is lined with oceanfront residences. No structures exist on this stretch of beach.

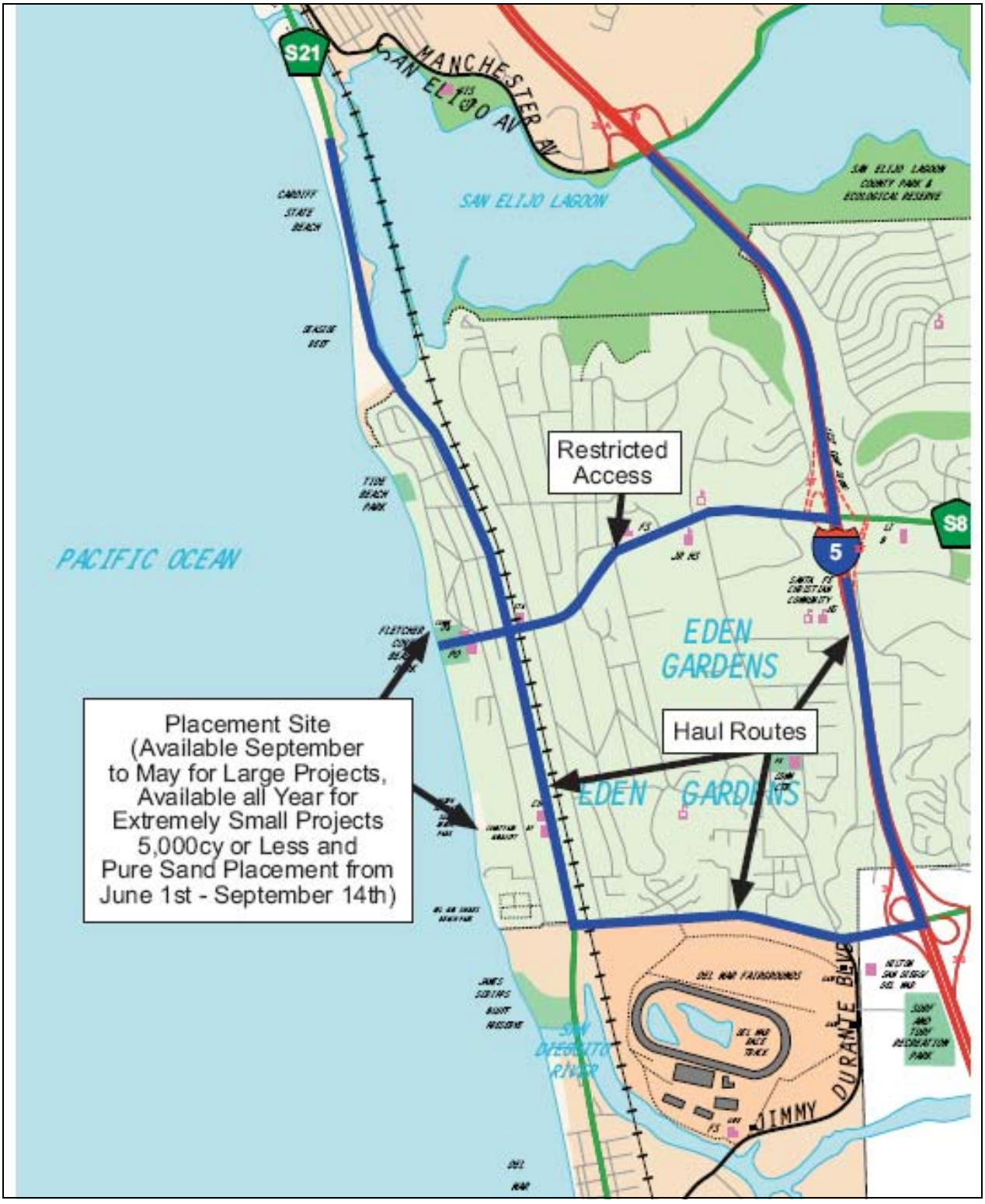
Placement at this location would be via dredge if source material is derived from marine sources or via truck if the source material is from upland. Sand would be placed in either a beach berm or in a low tide linear mound in the surfzone contingent on the quality of the material.

Sand placement at this site would be consistent with the restrictions established within the City's SCOUP program, which is currently pending resource agency approval. The program allows a maximum total of 150,000 cy/yr of sand at the site with a fines content of up to 10 percent. This amount may also include a maximum total of 25,000 cy/per fill event sand material for 11 - 25 percent fines for nine months between September 15th to May 31st. More detail regarding the seasonal restrictions of sand placement at this site is shown in Table 8.

Construction work windows may be constrained and the USACE and resource agencies would coordinate prior to construction. Constraints due to grunion runs would depend on beach condition and suitability for spawning, which would be checked during a pre-project habitat assessment. Least tern nesting sites are more than one mile from the receiver site. No sensitive snowy plover habitats occur in proximity to the receiver site. No sensitive hard bottom and vegetated habitats occur within the site boundaries, but do occur offshore.

The proposed haul route for trucks from the construction sites to the project site would generally be available to I-5 and Coast Highway 101 (Figure 9). Access along Via de la Valle may be possible per discussion and agreement with the City of San Diego and the City of Del Mar. Lomas Santa Fe Drive would provide restricted access due to the number of schools along this roadway. From I-5, the trucks would travel west along either Via de la Valle and north on Coast Highway 101 or take Lomas Santa Fe Drive directly to Fletcher Cove (located at the western terminus of Lomas Santa Fe Drive). Access from areas north of Lomas Santa Fe Drive and west of I-5 could potentially utilize Coast Highway 101 to arrive at Fletcher Cove. There is a concrete ramp at Fletcher Cove to allow trucks to access the beach and deposit their load for disbursement by earthmoving equipment. Trucks would loop back and exit at the point of beach entry.

Figure 8. City of Solana Beach CRSM Plan Placement Sites



Source: EDAW 2008

Figure 9. City of Solana Beach Haul Route and Staging

Based upon the maximum total of 150,000 cy per year, it is estimated that an approximate total of 63 truck trips would be required per working day for a project duration of 30 weeks; assuming 5 working days per week for approximately 8 hours each day. The typical nourishment project volume of 5,000 cy could be delivered in approximately 5 days; assuming 8 hour days.

5.4 City of Encinitas

The City of Encinitas is located approximately 25 miles north of downtown San Diego along the Pacific Coast. Four CRSM Plan sites are proposed within the City of Encinitas. All but one of these sites has been used previously as part of RBSP I or is proposed for beach nourishment under SCOUP II, as discussed within this section.

5.4.1 Cardiff Beach Nearshore Placement Site

The Cardiff Beach Nearshore site is newly proposed as part of the CRSM Plan and has not been used in any past beach nourishment or lagoon maintenance efforts. It is anticipated that this site would receive materials from restoration of San Elijo Lagoon. This site is approximately 825 feet in length and 780 feet in width and is located approximately 850 feet offshore (Figure 10). Sand would be deposited in this location via a dredge from a floating platform with stabilized pipe outlet in water depths of approximately -10 feet to -30 feet MLLW. This site would accommodate less than optimum sands and staggering of placements if more than one placement is occurring concurrently.

Construction may be constrained and the USACE and resource agencies would coordinate prior to construction. During predicted grunion runs, construction may be constrained over each 4-day run for a period of approximately 4 hours each night, but only during actual spawning runs. That constraint would not apply if the adjacent beach conditions were unsuitable for spawning. Least tern nesting sites are more than one mile from the receiver site. No Pismo clam beds were detected during recent surveys (SAIC 2009). An outfall pipeline covered with rip rap occurs within the site boundaries and supports localized occurrence of hard bottom indicator species such as giant kelp, feather boa kelp, sea palm, and sea fans. No other hard bottom or vegetated habitats occur within the site boundaries. Limitations and/or mitigation measures may be required in the vicinity of the rock armored pipeline and would be coordinated prior to site use with the San Elijo Joint Powers Authority and resource and regulatory agencies.

5.4.2 Cardiff Beach Onshore Placement Site

The Cardiff Beach onshore site has been used previously as part of SANDAG's RBSP I project. The site received 104,000 cy of sand as part of this project. This site would also potentially receive sand as part of the San Elijo Lagoon Restoration Project. Figure 10 illustrates the CRSM Plan Cardiff Beach Onshore footprint, which extends 1,500 feet along Coast Highway 101. Access to the site would be via a California State Park boat ramp located south of the beach deposition site and just north of what is referred to as restaurant row. The Cardiff receiver site is located adjacent to Highway 101, whose western edge is lined with rock revetment along this stretch. There are no structures located on the beach in this area aside from temporary lifeguard towers during the summer months.

Construction during spring-summer may be constrained and the USACE and resource agencies would coordinate prior to construction. Constraints due to grunion runs would depend on beach condition and suitability for spawning, which would be checked during a pre-project habitat assessment. Least tern and snowy plover nesting sites are more than one mile from the receiver site. The receiver site is located within potential wintering area for snowy plover and would be addressed during agency coordination based on considerations such as beach condition and historical use patterns. No sensitive hard bottom and vegetated habitats occur within the site boundaries, but do occur offshore.

Placement at this location would be via dredge if source material is derived from marine sources or via truck if the source material is from upland. Sand would be placed in either a beach berm or in a low tide linear mound in the surfzone contingent on the quality of the material.

The proposed haul route identified for trucks to the receiver site from the Saxony Detention Basin would follow Saxony Road north to La Costa Avenue and head east to I-5 as shown in Figure 11. From I-5, the trucks would travel south to Encinitas Boulevard. Trucks would proceed west on Encinitas Boulevard to Highway 101. Trucks would turn left at Highway 101 and would gain beach access just north of the Chart House Restaurant where a State Parks beach access point is located to the west of a pedestrian crossing traffic signal. Trucks may return to the Saxony detention basin location along the same route or could form a haul loop by traveling south to Lomas Santa Fe Boulevard in Solana Beach and proceeding east to I-5. Trucks would then head north on I-5 to Leucadia Boulevard. Trucks would then exit Leucadia Boulevard and travel east to Saxony Road to close the loop. To minimize truck congestion at the beach site, trucks would be queued at the Saxony detention basin location. Based upon the maximum total of 150,000 cy per year, it is estimated that an approximate total of 63 truck trips would be required per working day for a project duration of 30 weeks; assuming five working days per week for approximately eight hours each day. However, the most likely typical scenario would be 50,000 cy over 10 weeks.

Figure 10. City of Encinitas (Cardiff) CRSM Plan Placement Sites

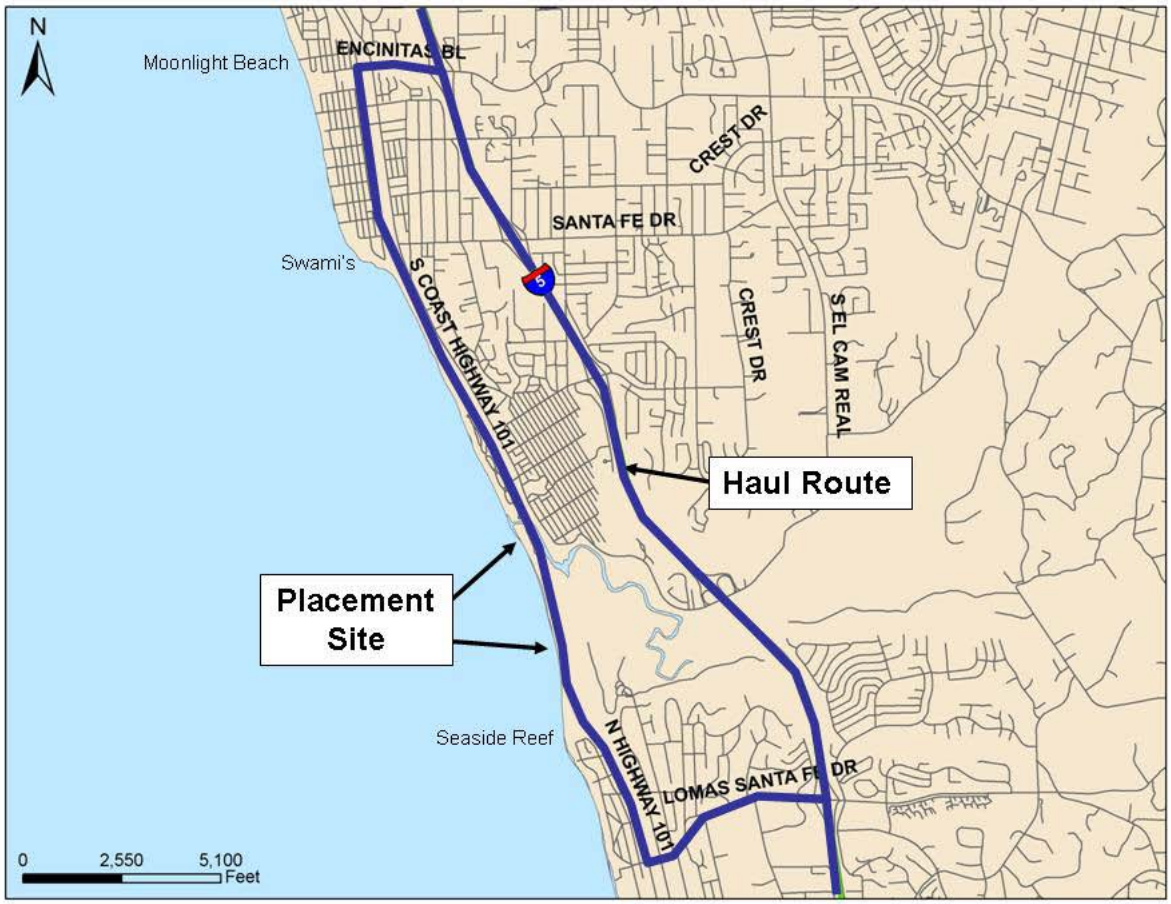


Figure 11. City of Encinitas (Cardiff) Haul Route

5.4.3 Moonlight Beach Onshore Placement Site

The Moonlight Beach onshore site has been used previously as part of SANDAG's RBSP I project. The site received 88,000 cy of sand as part of this project. Figure 12 illustrates the CRSM Plan Moonlight Beach Onshore footprint, which extends 1,500 feet between A Street and D Street. Access to the site would be from the western terminus of Encinitas Boulevard (B Street). The Moonlight Beach receiver site is located at the toe of bluffs, which are lined with oceanfront homes at the top. There are no structures located on the beach aside from the lifeguard tower and headquarters.

Placement at this location would be via dredge if source material is derived from marine sources or via truck if the source material is from upland. Sand would be placed in either a beach berm or in a low tide linear mound in the surfzone contingent on the quality of the material.

Sand placement at this site would be consistent with restrictions established within the City's SCOUP program, which is currently pending resource agency approval. The program allows placing up to a maximum of 150,000 cy/yr of sand at this site with a fines content of 10 percent or less and up to 25,000 cy/yr of sand with 11-25 percent fines. More detail regarding the seasonal restrictions of sand placement at this site is shown in Table 8.

Construction during spring-summer may be constrained and the USACE and resource agencies would coordinate prior to construction. Constraints due to grunion runs would depend on beach condition and suitability for spawning, which would be checked during a pre-project habitat assessment. Least tern nesting sites are more than two miles from the receiver site. No sensitive snowy plover habitats occur within two miles of the receiver site. No sensitive hard bottom and vegetated habitats occur within the site boundaries and only limited hard bottom and vegetated habitats occur offshore.

Material to be used for the program could be temporarily stored at the Saxony Detention Basin located on Saxony Road to allow time for resource agency approval or seasonal restrictions. Another potential stockpile location would be at the City's Public Works facility located on Calle Magdalena.

The proposed haul route identified for trucks to the receiver site from the Saxony Detention Basin would follow Saxony Road north to La Costa Avenue and head east to I-5 as shown in Figure 13. From I-5, the trucks would travel south to Encinitas Boulevard and head west to Moonlight Beach. There is a public access point for Moonlight Beach from the western terminus of Encinitas Boulevard (B Street). The trucks would enter at this beach access point and deposit their load for disbursement by earthmoving equipment. Trucks would loop back and exit at the point of beach entry. Trucks may return to the Saxony detention basin location along the same route or utilize Coast Highway 101 north from Encinitas Boulevard to La Costa Avenue. To minimize truck congestion at the beach site, trucks would be queued at the Saxony detention basin location. Based upon the maximum total of 150,000 cy per year, it is estimated that an approximate total of 63 truck trips would be required per working day for a project duration of 30 weeks and assuming five working days out of each week for approximately eight hours each day. However, the most likely typical scenario would be 50,000 cy over 10 weeks.

Figure 12. City of Encinitas (Moonlight Beach) CRSM Plan Placement Site

Source: EDAW 2008

Figure 13. City of Encinitas (Moonlight Beach) Haul Route and Staging

Construction staging is available in the Moonlight Beach parking lot and near the restrooms. The City of Encinitas would coordinate with the Parks and Recreation Department regarding this staging area. Another potential staging area would be the Park-n-Ride lot located immediately east of I-5 along the north side of La Costa Avenue. The Park-n-Ride lot would only be available for use from 9:00 a.m. to 3:30 p.m. Monday through Friday. Staging areas are utilized by trucks, either empty or filled, awaiting dispatch to pick-up or deliver opportunistic sand material. Specifically regarding the use of the Park-n-Ride lot, the trucks would not interfere or impede access. An encroachment permit would need to be obtained by the City from Caltrans for use of the Park-n-Ride lot and would contain conditions to assure no damage to the pavement would result from the number of trucks and the loads.

5.4.4 Batiquitos Beach (Encinitas) Onshore Placement Site

The Batiquitos Beach Onshore site has been used previously as part of SANDAG's RBSP I project. The site received 118,000 cy of sand as part of this project. Figure 14 illustrates the CRSM Plan Batiquitos Beach Onshore footprint, which extends 1,400 feet between the Encinitas / Carlsbad jurisdictional line and the southern terminus of Parliament Road.

Sand placement at Batiquitos Beach would be consistent with restrictions established within the City's SCOUP program, which is currently pending resource agency approval. The program would allow placing up to a maximum of 120,000 cy/yr of sand at the site with a fines content of 10 percent or less and up to 25,000 cy/yr of sand with 11-25 percent fines. Two placement types are proposed under this program: beach berm and surfzone placement. More detail regarding the seasonal restrictions of sand placement at this site is shown in Table 8.

Placement at this location would be via dredge if source material is derived from marine sources or via truck if the source material is from upland. Sand would be placed in either a beach berm or in a low tide linear mound in the surfzone contingent on the quality of the material.

Construction during spring-summer is constrained and the USACE and resource agencies would coordinate prior to construction. Least tern and snowy plover nesting sites are located less than 1,000 ft from the receiver site. In addition, the receiver site is adjacent to critical habitat and partially located within potential wintering areas for snowy plover. Constraints due to grunion runs would depend on beach condition and suitability for spawning, which would be checked during a pre-project habitat assessment. This also may be relevant to Pismo clams, although they were detected during recent reconnaissance beach surveys, no substantial beds were noted (SAIC 2009).

The proposed haul route for trucks to the Batiquitos site from the Saxony Detention Basin would be to follow Saxony Road north to La Costa Avenue and either travel north on Carlsbad Boulevard to the site or travel north on I-5 to Poinsettia Lane and head west to Carlsbad Boulevard and travel south to the site as shown in Figure 15. The trucks would enter south of the lagoon inlet from Carlsbad Boulevard and deposit their load for disbursement by earthmoving equipment. Trucks would loop back and exit at the point of beach entry. Trucks may return to the Saxony Detention Basin location along the same route. To minimize truck congestion at the beach site, trucks would be queued at the Saxony detention basin location.

Based upon the maximum total of 120,000 cy per year, it is estimated that an approximate total of 50 truck trips would be required per working day for a project duration of 24 weeks and assuming five working days out of each week for approximately eight hours each day. However, the most typical scenario would be 10 weeks. No staging area is identified for the Batiquitos receiver site.

5.4.5 Batiquitos Beach Nearshore Placement Site

The Batiquitos Beach Nearshore site would be a site that is new to the CRSM Plan and that has not been used in previous beach nourishment efforts. This site is approximately 550 feet in length and 800 feet in width and is located approximately 700 feet offshore (Figure 14). Sand would be deposited in this location via dredge in water depths of approximately -10 feet to -30 feet MLLW. This site would accommodate a broader percentage of fines than the onshore site, thereby, providing greater flexibility for beneficial reuse of maintenance materials dredged from Batiquitos Lagoon.

Construction may be constrained and the USACE and resource agencies would coordinate prior to construction. Least tern nesting sites are located less than 3,000 from the placement site. During predicted grunion runs, construction may be constrained over each 4-day run for a period of approximately 4 hours each night, but only during actual spawning runs. That constraint would not apply if the adjacent beach conditions were unsuitable for spawning.

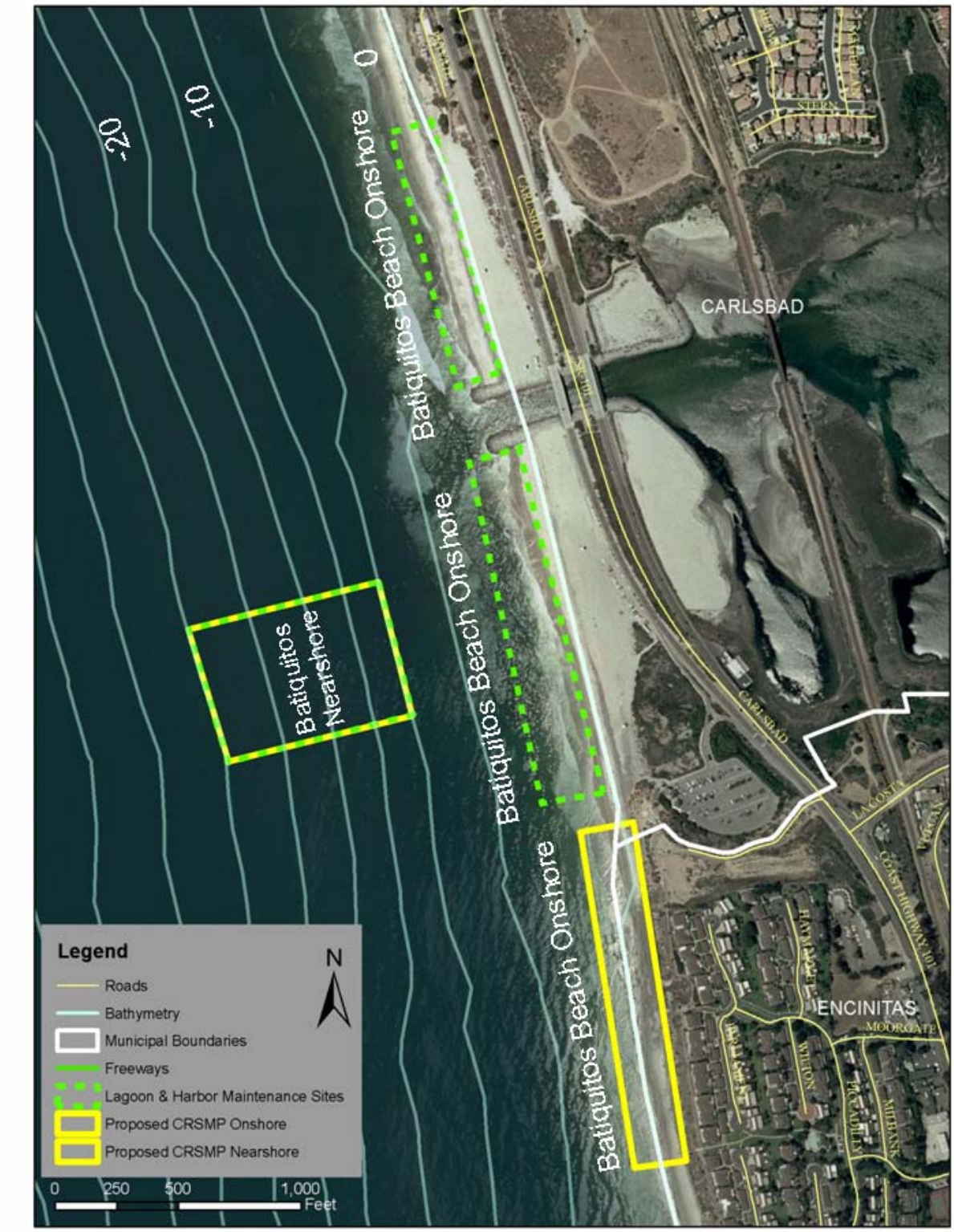


Figure 14. City of Encinitas (Batiquitos Beach) CRSM Plan Placement Site

Figure 15. City of Encinitas (Batiquitos Beach) Haul Route and Staging
Source: EDAW 2008

5.5 City of Carlsbad

The City of Carlsbad is located approximately 30 miles north of downtown San Diego along the Pacific Coast. One CRSM Plan site is proposed within the City of Carlsbad. This site has been used previously as part of nourishment projects, as discussed within this section.

5.5.1 South Carlsbad State Beach Onshore Placement Site

The South Carlsbad onshore placement site has been used previously as part of SANDAG's RBSP I project. The site received 160,000 cy of sand as part of the RBSP project in Spring 2001. Figure 16 illustrates the CRSM Plan South Carlsbad onshore site footprint, which extends approximately 3,000 feet between Encinas Creek to the south and Palomar Airport Road to the north. Access to the site would be from Carlsbad Boulevard just north in the vicinity of Encinas Creek. The South Carlsbad onshore site is located at the toe of a low bluff, which South Carlsbad Boulevard lines. There are no structures located on the beach at the site aside from a lifeguard tower just south of Encinas Creek.

The South Carlsbad onshore Placement site (Encinas Beach) is currently permitted for opportunistic beach fill under the City's program. The City's program allows 150,000 cy of sand to be placed on the site per year with a maximum of 25 percent fines. The program's seasonal restrictions are shown in Table 9, below.

Table 9. City of Carlsbad Proposed Limitations on Sand Placement Quantities

Season	Maximum Fines Content	Maximum Annual Volume	Initial Maximum Beach Fill Volume
Fall/Winter Sept 15 – Mar 15	25%	150,000 cy	30,000 cy
Spring Mar 15 – last Monday in May (Memorial Day)	15%	40,000 cy	20,000 cy
Summer Memorial Day – first Monday in Sept (Labor Day)	---	---	---
Late Summer Option Labor Day – Sept 15	15%	10,000 cy	5,000 cy

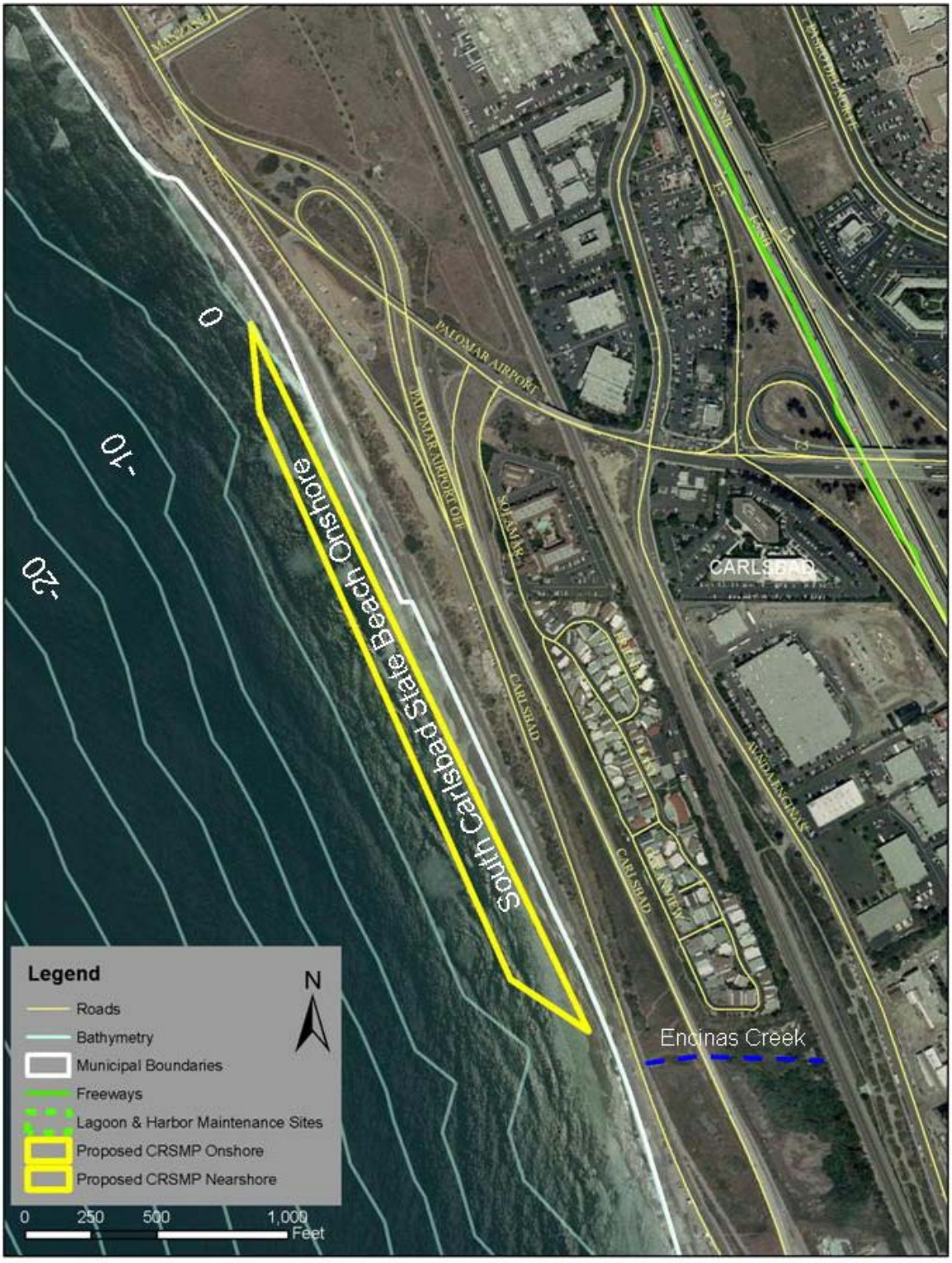


Figure 16. City of Carlsbad CRSM Plan Placement Site

Figure 17. City of Carlsbad Haul Route

Beach berm and surfzone placement types are permitted for use under the program. Although permitted for opportunistic beach fill, no opportunistic projects have taken place at the site to date.

Construction during spring-summer may be constrained and the USACE and resource agencies would coordinate prior to construction. Constraints due to grunion runs would depend on beach condition and suitability for spawning, which would be checked during a pre-project habitat assessment. Least tern and snowy plover nesting sites are more than two miles from the receiver site. The receiver site is located within potential wintering area for snowy plover. No sensitive hard bottom and vegetated habitats occur within the site boundaries and only limited hard bottom and vegetated habitats occur offshore.

The proposed haul route for trucks from upland sources to the site would include Palomar Airport Road, Cannon Road and Carlsbad Boulevard (Figure 17). Beach access would be gained just south of the Encinas Creek at the North Ponto State Beach Parking lot. An approximately eight foot wide sand ramp used for lifeguard access is available for use at this location, which would allow for equipment to access the beach. Minor, temporary improvements would be needed to this access point to accommodate truck ingress and egress. Alternatively, loaded trucks could end dump sand off of the side of Carlsbad Boulevard just north of the Encinas Creek to create a temporary beach access ramp. This sand ramp would be removed once beach deposition activities are completed.

5.6 City of Oceanside

The City of Oceanside is located approximately 35 miles north of downtown San Diego along the Pacific Coast. Two CRSM Plan sites are proposed within the City of Oceanside. Both of these sites have been used previously as part of ongoing maintenance of Oceanside Harbor and individual nourishment projects, as discussed within this section.

5.6.1 South Oceanside Nearshore Placement Site

As shown in Figure 18**,** the South Oceanside Nearshore site is located just north and offshore of the Oceanside Municipal Pier. A portion of this site was previously utilized by the USACE for Oceanside Harbor Dredging activities. The proposed site is approximately 10,000 feet in length and 1,300 feet in width. The site would extend from approximately Seagaze Drive to the north to Vista Way to the south. Sediment would be placed via dredge approximately 700 feet offshore in water depths from -10 feet to -30 feet MLLW.

Within this nearshore placement footprint described above, the southern 3,850 feet is to be designated as a restricted placement area due to proximity to hard-bottom habitat (Figure 18). This restricted area extends from Witherby Street to the north to Vista Way to the south. Placement would be allowed within this area, but would require additional monitoring to offset potential biological impacts.

Construction during spring-summer may be constrained and the USACE and resource agencies would coordinate prior to construction. During predicted grunion runs, construction may be constrained over each 4-day run for a period of approximately 4 hours each night, but only during actual spawning runs. That constraint would not apply if the adjacent beach conditions

were unsuitable for spawning. Least tern nesting sites are more than two miles from the receiver site. No Pismo clams beds were detected during recent surveys (SAIC 2009). Two localized hard bottom (cobble, rock) areas occur in the southern portion of the site and may constrain site use. The larger of the two hard bottom areas supports localized occurrence of hard bottom indicator species such as surfgrass, giant kelp, feather boa kelp, sea palm, and sea fans and should be avoided during sand placement. The smaller hard bottom area is sand scoured and only supports non-sensitive turf algae.

5.6.2 South Oceanside Onshore Placement Site

A portion of the South Oceanside onshore site has been used previously as part of SANDAG's RBSP I project and is currently pending permits for opportunistic beach fill as part of the City's SCOUP program. The site received 380,000 cy of sand as part of RBSP I project in the Spring 2001.

Figure 18 illustrates the CRSM Plan South Oceanside Onshore footprint, which extends approximately 9,000 feet approximately between Seagaze Drive to the north Kelly Street to the south. The proposed beach widths of this receiver site would be approximately 230 feet. Northern portions of the South Oceanside onshore site spans a portion of Oceanside Beach known as The Strand, which is a city road that runs adjacent to the beach just south of the pier. This road is protected on the west by a rock revetment. The Strand is lined by residences immediately to the east. South of The Strand portion of the receiving beach, the beach is lined by coastal residences typically behind a low revetment structure. There are no structures located on the beach aside from a temporary lifeguard towers along the entire project site during summer months.

Placement at this site would be consistent with limits and restrictions established within the City's SCOUP Program, which is currently pending approval. This program would allow a maximum total of 150,000 cy/yr of sand to be placed at this site. The annual maximum quantity is related to the percentage of fines in the opportunistic material. The ultimate 150,000 cy/yr is based on a maximum proportion of fines of 25 percent, with the remaining 75 percent being sand. The City of Oceanside's SCOUP program also allows for placement of an annual maximum of 50,000 cy of less-than-optimal material (fines up to 40 percent). That material would only be placed below the mean high tide line to allow the fines to be winnowed away and deposited offshore, leaving the sand behind on the beach. Use of material with up to 40 percent fines is considered appropriate because the fraction of fines that exists in beach sediments at approximate depths of -30 MLLW, where fines would eventually settle, is between 19 and 28 percent fines. The program's seasonal placement restrictions are outlined in Table 10, below.

Construction during spring-summer may be constrained and the USACE and resource agencies would coordinate prior to construction. Constraints due to grunion runs would depend on beach condition and suitability for spawning, which would be checked during a pre-project habitat assessment. Least tern nesting sites are more than two miles from the receiver site. No sensitive snowy plover habitats occur within 3,900 feet of the receiver site. No sensitive hard bottom and vegetated habitats occur within the site boundaries and only limited hard bottom and vegetated habitats occur offshore.

Table 10. City of Oceanside Seasonal Restrictions

Percent Fines	Time Period	Maximum Quantities (cy) per Season	
		Fall/Winter (Sept 21 – Mar 21)	Spring/Summer (Mar 22 – Sept 20)
Less than 25%	Per Week	15,000	8,333
	Per Year	150,000	50,000
Between 26% and 40%	Per Week	5,000	0
	Per Year	50,000	0

Truck accesses points to the site are numerous as there are many city streets with a western terminus on the beach in the form of lifeguard access ramps (Figure 19). However, the preferred access would be from an existing concrete ramp at the western terminus of Oceanside Boulevard, which has been used previously for truck deliveries of sand. In addition to these streets, access to the beach is also along the northern portions of The Strand where the rock revetment is not in place.

The City of Oceanside has identified a sediment stockpile location at El Corazon. This site could be used for temporary storage of suitable beach sand if the rate of sand supply to Oceanside's beaches exceeds the permitted beach placement rate according to the proposed program, or if some opportunistic sand quantity is too small to be cost effective for delivery. That small quantity may be stored and combined with other opportunistic sources.

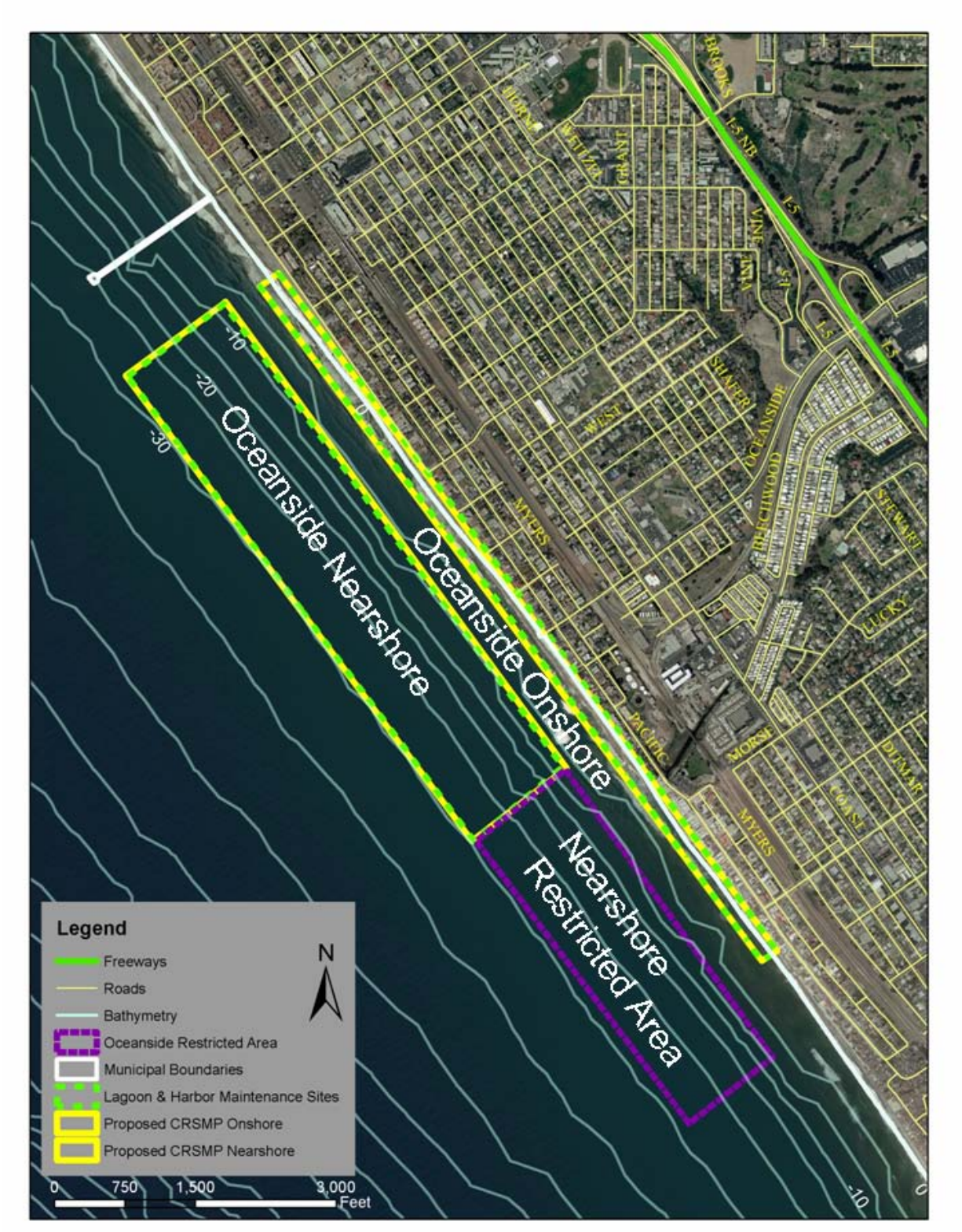


Figure 18. City of Oceanside CRSM Plan Placement Sites

Source: EDAW 2005

Figure 19. City of Oceanside Haul Route and Stockpile Location

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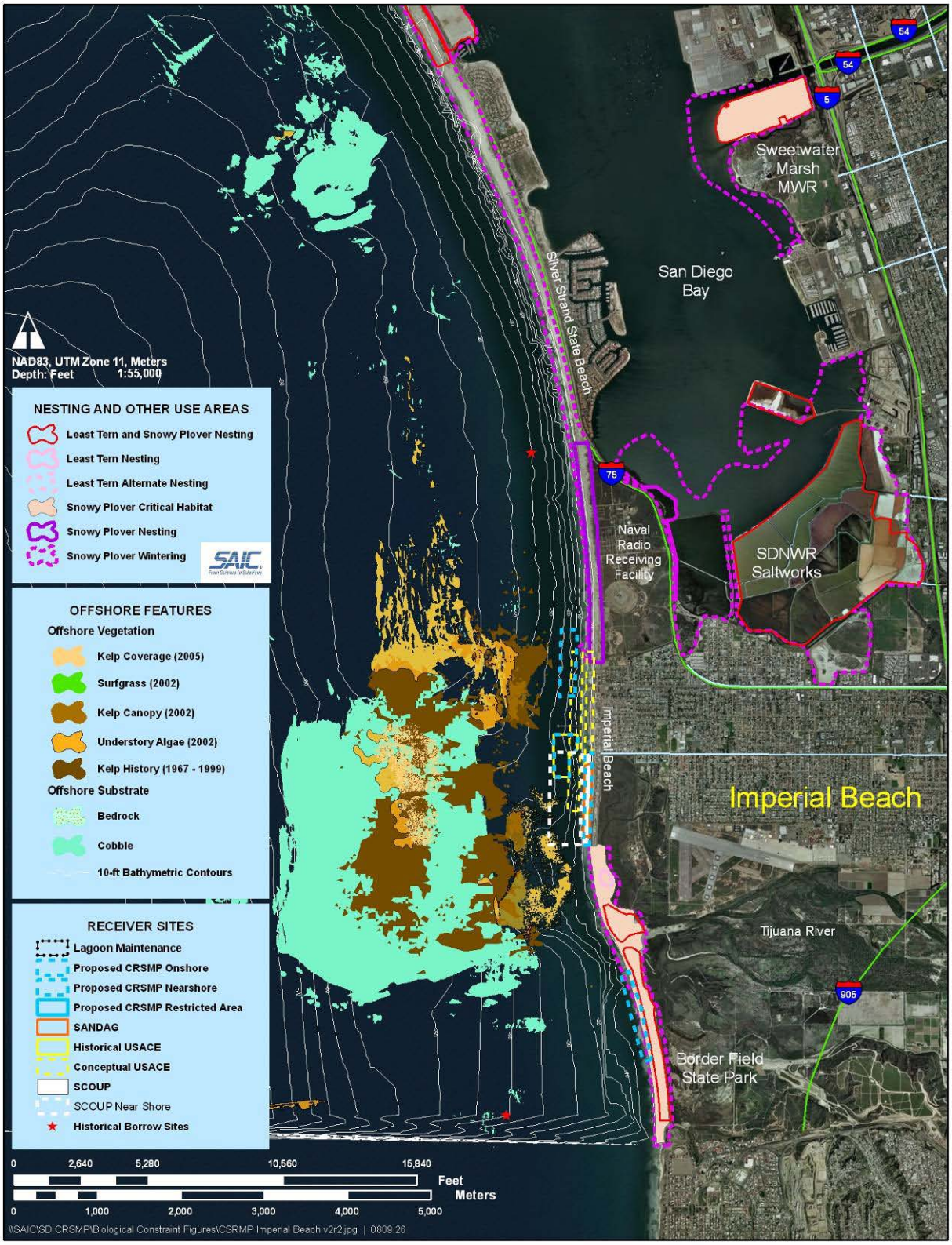
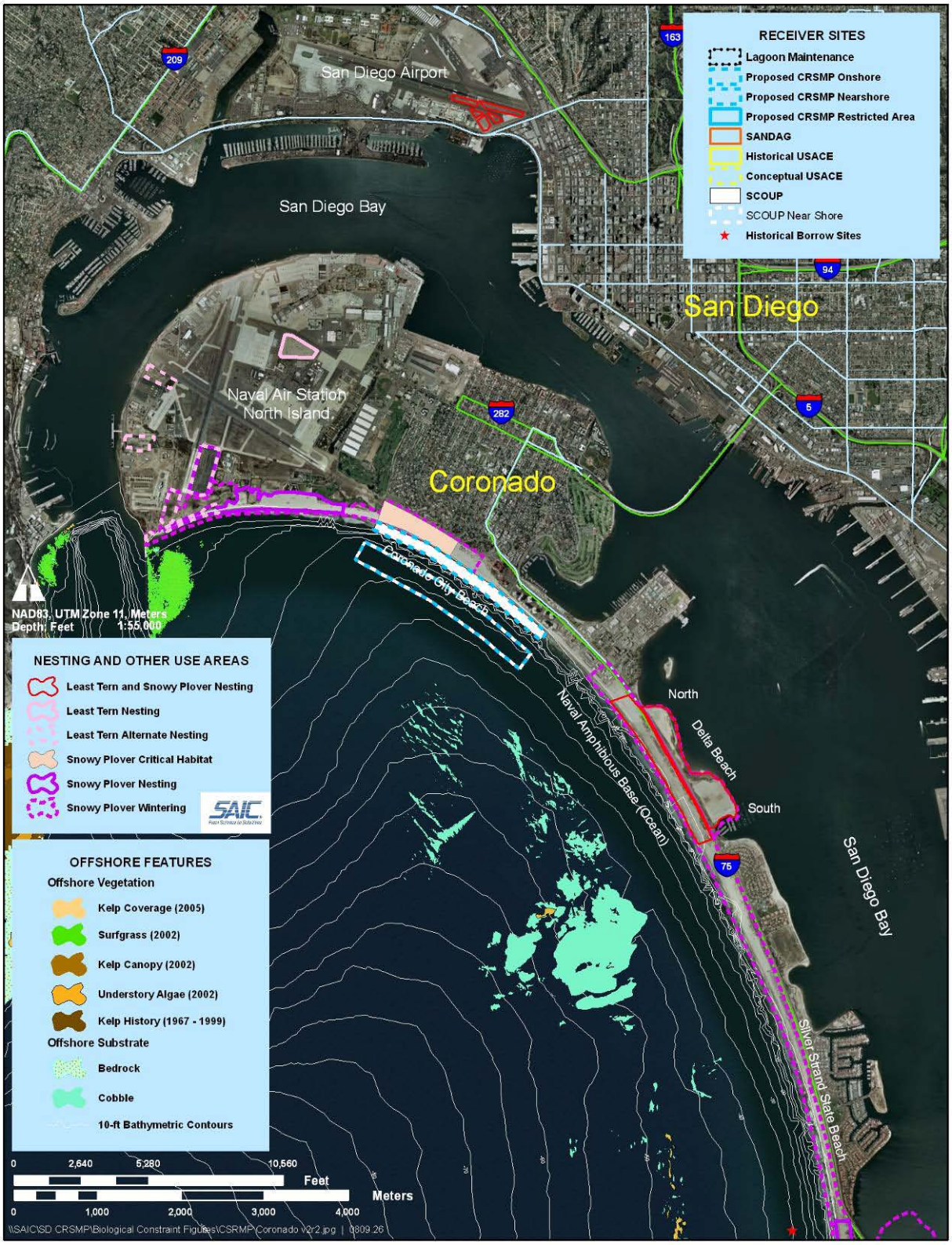
APPENDIX A

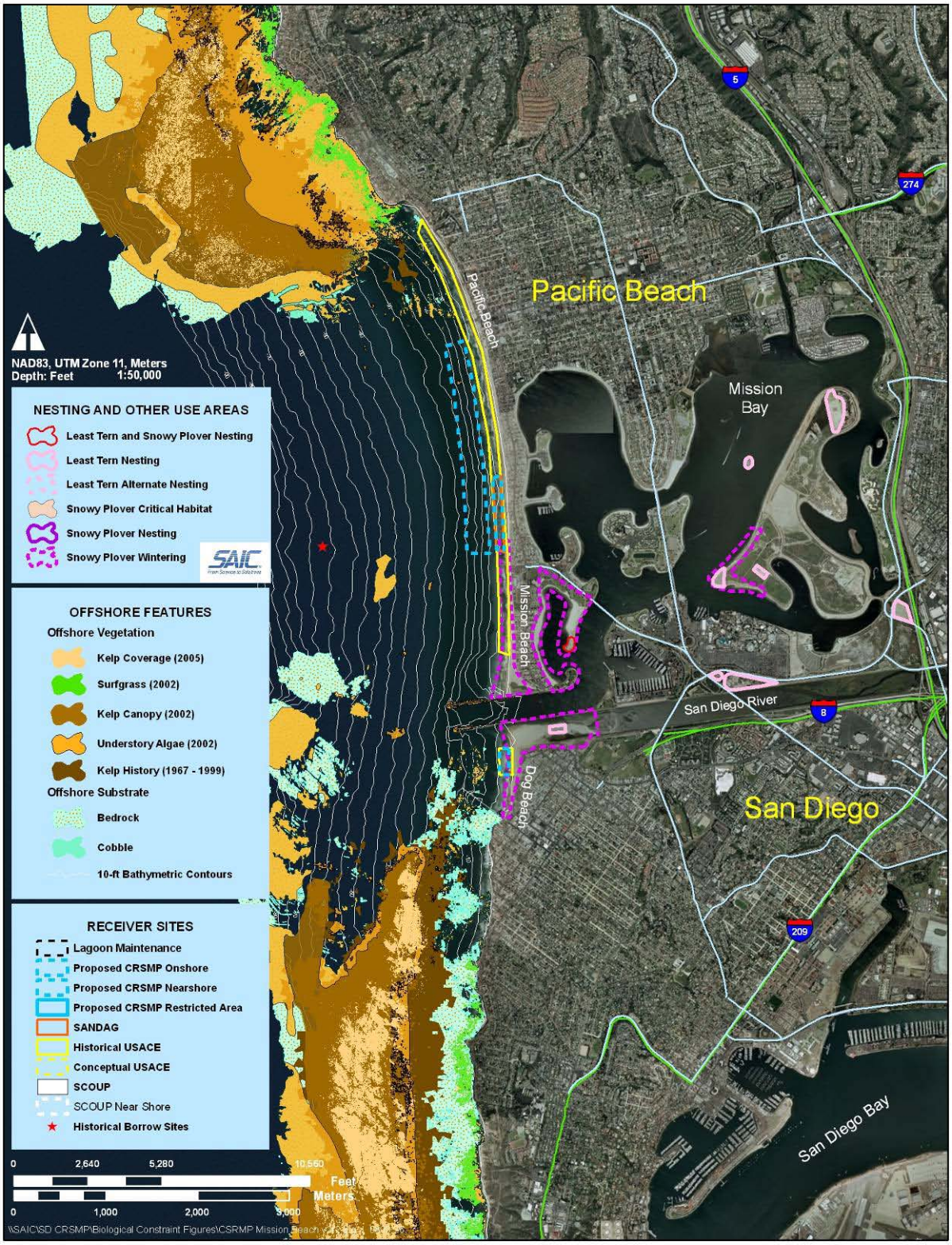
HABITAT MAPS



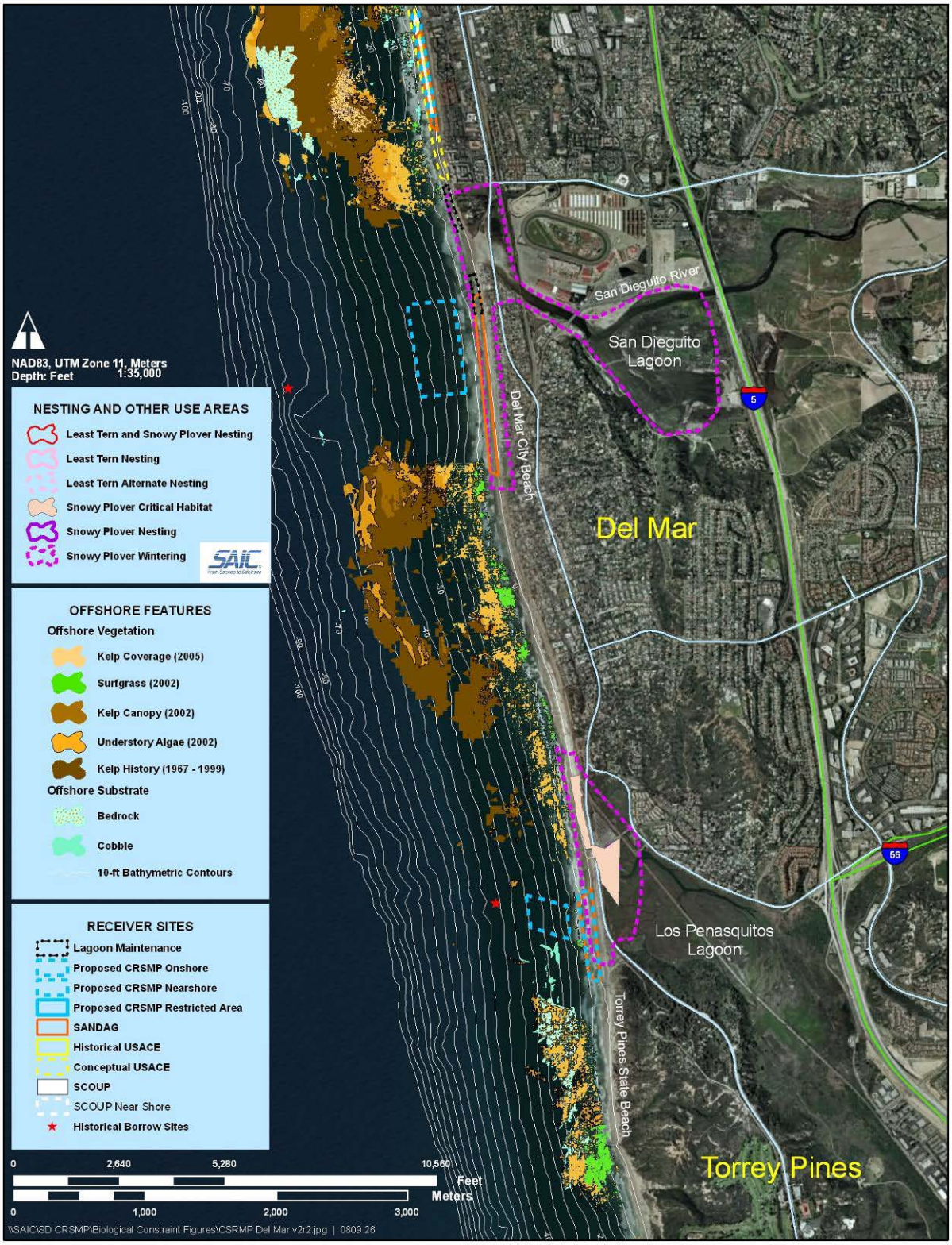
Sensitive biological resource areas in the vicinity of Imperial Beach sediment management area



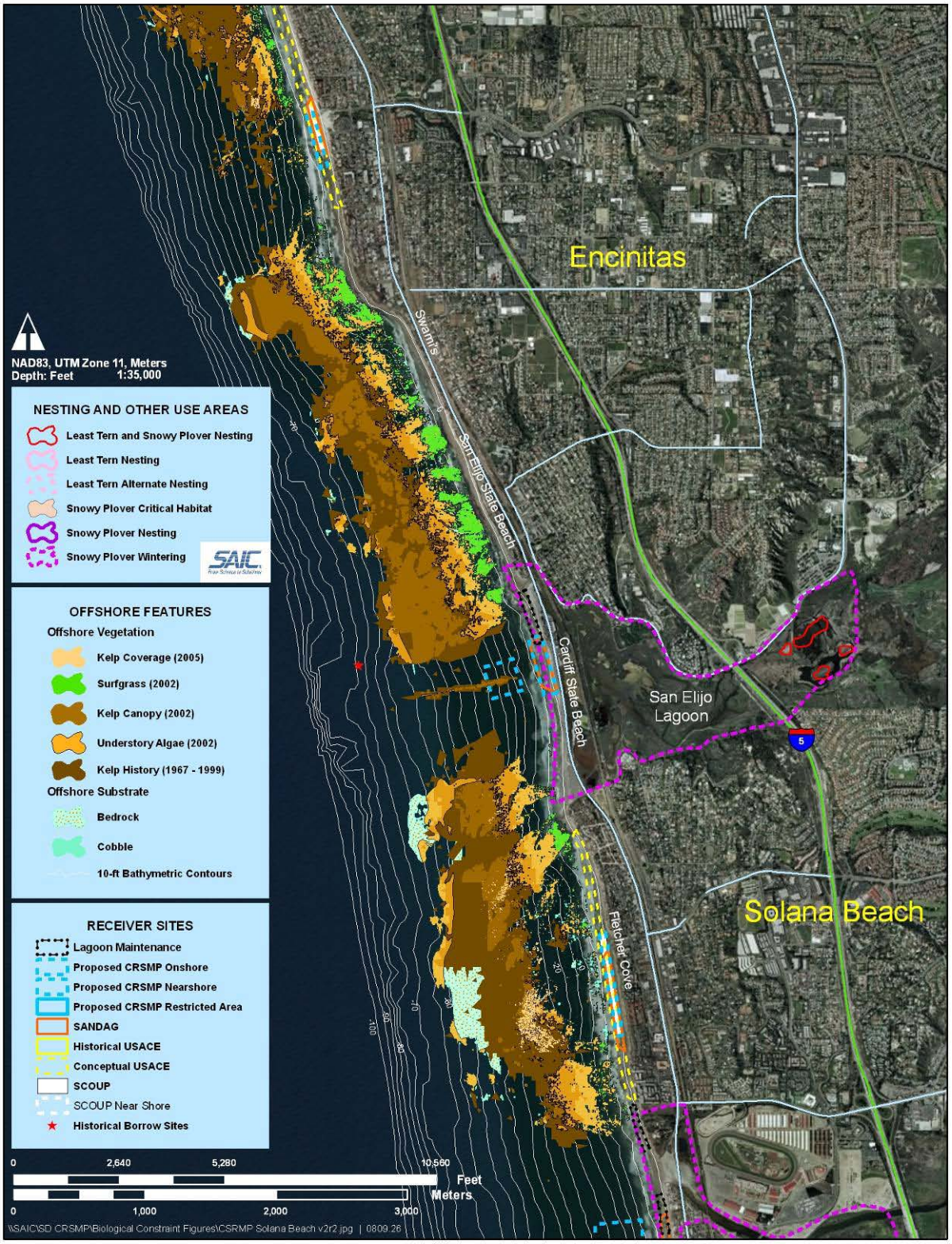
Sensitive biological resource areas in north San Diego Bay in the vicinity of Coronado sediment management areas.



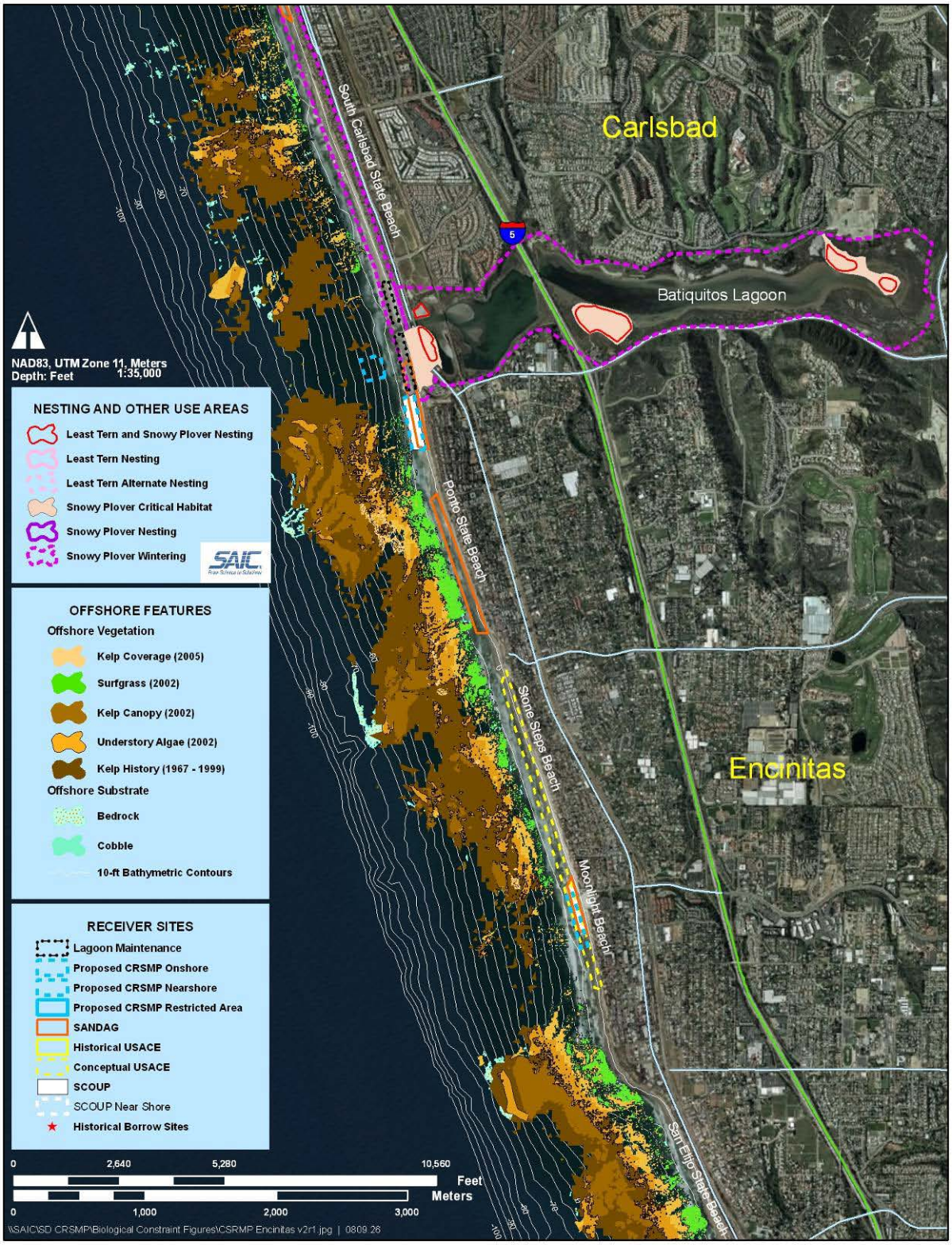
Sensitive biological resource areas in the vicinity of Mission Beach sediment management areas.



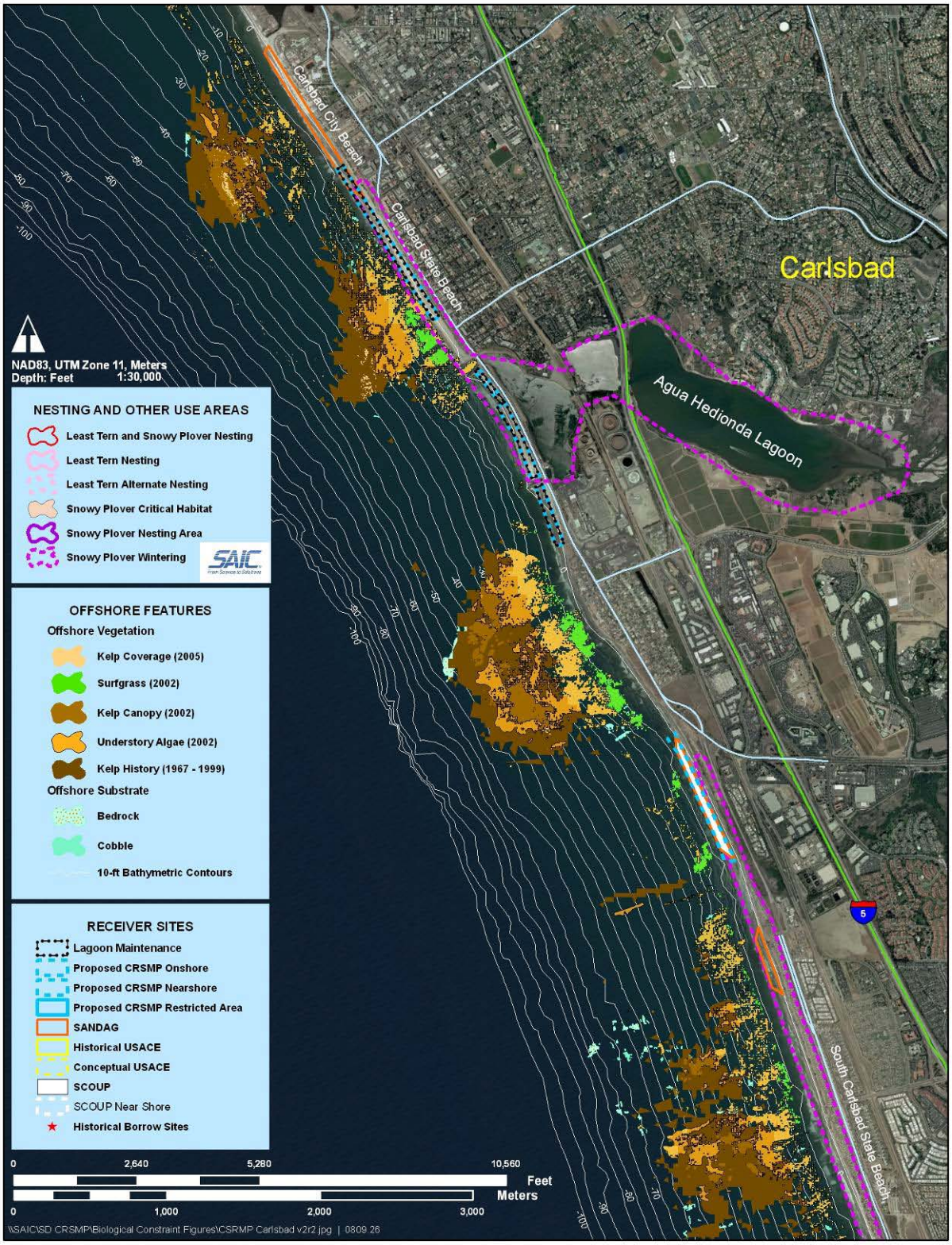
Sensitive biological resource areas in the vicinity of Del Mar and Torrey Pines sediment management areas.



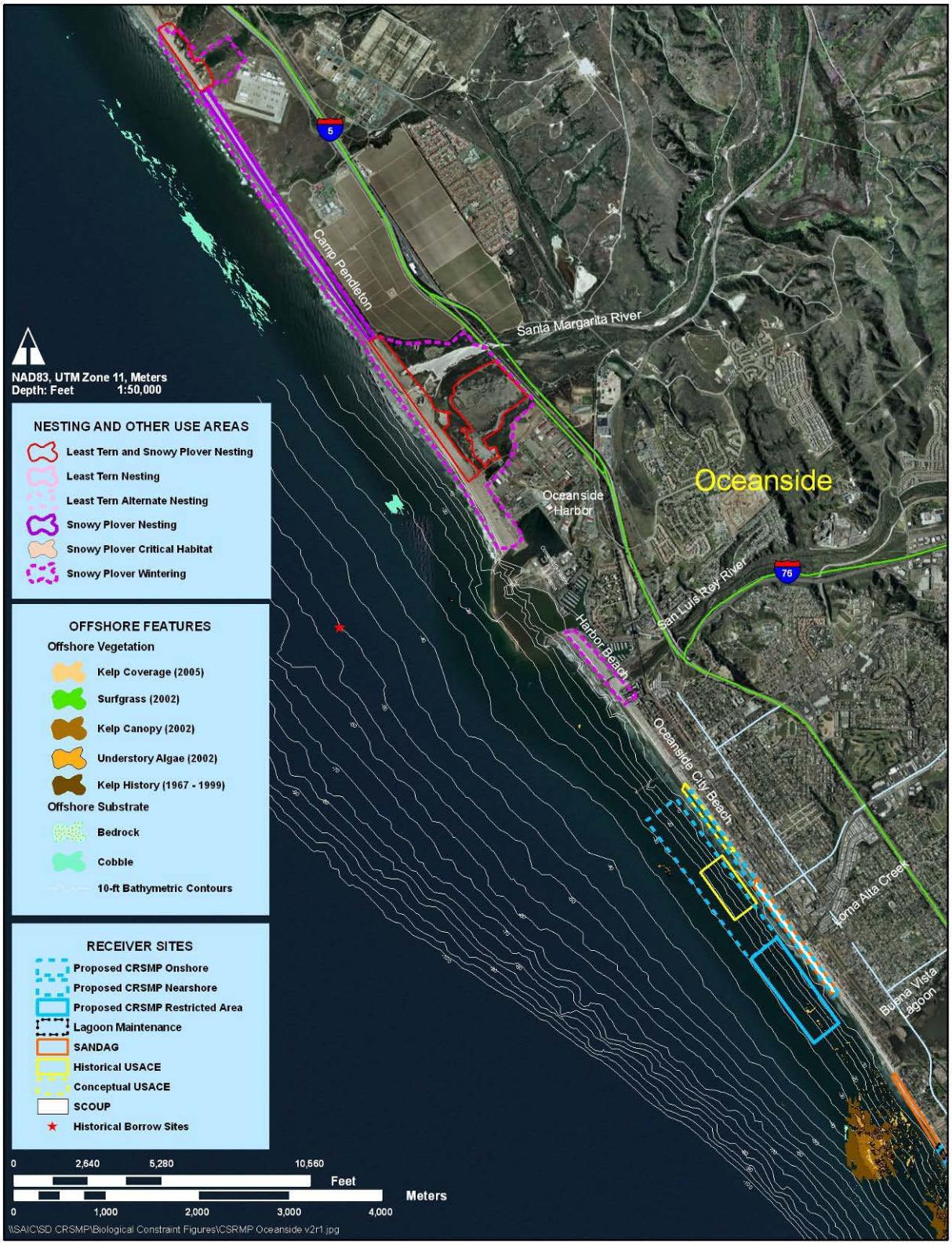
Sensitive biological resource areas in the vicinity of Encinitas and Solana Beach sediment management areas.



Sensitive biological resource areas in the vicinity of Carlsbad and Encinitas sediment management areas.



Sensitive biological resource areas in the vicinity of Carlsbad sediment management areas.



Sensitive biological resource areas in the vicinity of Oceanside sediment management areas.